THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

Curtailment of pig iron production is in progress and sharper reductions will come at once. The movement is well under way East and West and the Southern producers are expected to take action at a meeting in Birmingham on Oct. 2. Demand in all lines has been light the past week. Buying could scarcely be expected while the trade was engrossed with the surprising fall of the steel securities on the one hand and on the other taking note of the curtailment of working forces at iron mines, furnaces, rolling mills and in several important industries consuming iron and steel. More of such news has come in this single week than in any like period in years; but it is noteworthy that the work of adjusting production to consumption, not only in the iron trade but in consuming lines, is going on in an orderly way, without sensation or demoralization. The consensus seems to be that while the wave of extraordinary prosperity has subsided, the ensuing quiet does not mean disaster but a process of healthful readjustment. At a meeting in Pittsburg on Tuesday representatives of more than 100 blast furnaces in Ohio, West Virginia and Western Pennsylvania appointed a committee to arrange for a one-third reduction in output in the ensuing three months. The movement includes the United States Steel Corporation and the Republic Iron & Steel Co., and if plans now proposed are carried out, it will mean a reduction of 800,000 tons in output before Jan. 1. The Eastern furnacemen's committee has prepared a plan that will mean an important restriction in that field. Alabama interests that will be represented at the meeting of the association furnaces in Birmingham this week have no definite plans, but consider that with 175,000 tons of iron piled at the furnaces in that district, there should be an end to the stocking of high-priced metal. Events of the past fortnight have made an impression upon Southern railroads, and they are expected soon to grant the 50-cent reduction in freights to the Ohio river, refused early in the month. This would probably mean a 20-cent reduction north of the Ohio, giving Southern furnaces 70 cents more margin to meet Northern competition. Northern irons are fully that much lower than Southern in the Central West, on a $11.75 Birmingham basis for No. 2. Lower prices have been quoted in the week, and $11 iron is no longer confined to the East. In the Chicago district the leading steel interest has been a seller of foundry iron in recent weeks, after being out of the trade for many months. Indications are that furnaces in Central territory are aggressively pushing for much of the business Southern furnaces took previous to the abnormal conditions of the past 18 months. Steel-making pig iron is in little demand, the steel companies having a blast furnace capacity more than equal to the present rate of melting. While steel prices were reaffirmed at the recent meeting of billet producers, the carbon limit of steel carrying the base price was extended to .25 percent, thus doing away with the $1 extra on a considerable tonnage of axle steel. Finished materials, which were held at a moderate level while pig iron soared, are not paralleling its decline. Bar iron has fallen to a point at which some producers have ceased to compete for business, having sold in some cases more than $5 a ton below steel bars. While steel is maintained on the 1.60c Pittsburg basis, there are reports of sales under guarantees against decline, but leading producers have refused to make such guarantees. Business in structural steel continues to come up and the prospects here are better than in most finished lines. The Wabash order for 3,000 tons at Pittsburg is to be followed by a contract for 9,000 tons in the near future. Plate mills in the agreement appear to be maintaining prices, but there is some cutting by independent Eastern sellers. The tin plate mills, after a long run on exclusively domestic business, are about to turn to rebate plates, as home demand declines. Export business in several finished lines is to be pushed by the steel corporation, Great Britain rather than Germany being regarded as the field offering least resistance.

PITTSBURG.

OFFICE OF *The Iron Trade Review*, 429 PARK BUILDING, Sept 30.

For the first time in the history of the iron trade in this district the merchant and steel works furnace operators met on common ground yesterday afternoon in this city, for the purpose of discussing ways and means of steadying the present sagging market. The meeting was held in the offices of the Carnegie Steel Co., Carnegie Building, and J. G. Butler, Jr., president of the Bessemer Pig Iron Association of Youngstown, O., presided. More than 100 furnaces were represented by those in attendance, thus insuring the success of any proposition looking toward the curtailment of production. After considerable discussion a committee of five was appointed for the purpose of drawing up a plan by which the present over-production can be curtailed. It consists of J. G. Butler, Jr.; D. B. Meacham, of the Cleveland Furnace Co.; W. P. Snyder, of the Shenango Furnace Co.; D. G. Kerr, of the United States Steel Corporation; and A. W. Thompson, president of the Republic Iron & Steel Co. This committee will make its report within a few days, either to the furnace operators individually, or to another meeting. Merchant and steel works furnace interests in the Pittsburg, Cleveland and Columbus districts, Mahoning and Shenango Valleys and the Hanging Rock region in Ohio were represented, and furnaces in the northwestern section of this State will also abide by the decision of the committee. Whether the plan to bank each stack in the next three months for a period of thirty days will be adopted, or whether each furnace will be asked to curtail output by a certain percentage of its annual production during this period is for the committee of five to decide. It is estimated that if the 30-day shut-down proposition is agreed to the production of the districts represented will be curtailed about 800,000 tons between Oct. 1 and the first of the year. A meeting of the Eastern furnace operators will be held this week in New York to hear the report of their committee, and it is probable that a plan looking toward curtailment of production in that section of the country will be adopted. It is expected that furnaces in the Birmingham, Ala., district will also follow. Some of them are now out for repairs.

A number of new blast furnaces at steel works in this district were to be completed and blown in during the

coming month, but starting up will be postponed until the market is in a more favorable condition. Still lower prices have been made on forge and foundry irons during the week, Northern No. 2 having sold at $15, Pittsburg, while forge went at $14.25. These prices bar out Southern producers almost entirely except in cases where certain brands are especially desired for a mix.

On Monday of this week the American Tin Plate Co. shut down about forty of its mills and at the plants in operation notices were posted that the rolling of tin plate for the rebate trade would be resumed on Oct. 1. Owing to the heavy domestic demand the rolling of tin plate for export was discontinued on June 1, but the domestic demand has fallen off considerably in the past month. The tin plate industry has been unusually prosperous this year and mills that were shut down last year for four to six months will not be idle this year for more than one or two months.

There is little buying in the finished steel lines and conditions continue practically unchanged. The Wabash Railroad placed a contract with the Pennsylvania Steel Co. during the week for its train shed requiring about 3,000 tons of structural material. Another Wabash contract for about 9,000 tons will be awarded shortly.

Pig Iron.—Buying in small lots for prompt shipment continues, and competition has been so keen during the week that prices have been still further shaded. Northern No. 2 has been sold in small lots at $15, but this by no means represents the basis of all quotations, as the majority of the furnaces refuse to sell under $15.50 and some are holding their product firm at $16. Several small lots of gray forge were sold during the week at $14.25. Bessemer iron on the other hand is being held firm at $16 by the majority of the Valley stacks, although $15.50 has been done and might be still, to dispose of a few odd lots. The feeling pretty generally prevails that bottom has about been reached and that furnaces cannot make further concessions and operate with a profit. In anticipation of the curtailment program proposed by the furnaces a number of foundrymen in this district are already endeavoring to cover for the next two or three months, but furnaces are disinclined to entertain present prices for future deliveries. At present seven stacks are out of blast in the Valley districts and several in the Pittsburg district. Repairs are being made at nearly all of these stacks, but it is certain that they will not be blown in until more favorable conditions prevail. We make the following quotations:

Bessemer, Valley	$15 50 to 16 00
Bessemer, Pittsburg	16 35 to 16 85
No. 1 Foundry	15 75 to 16 00
No. 2 Foundry	15 00 to 15 50
Gray Forge, Pittsburg	14 25 to 14 50
Chilled Basic, Valley	15 50 to 15 75
Chilled Basic, Pittsburg	16 35 to 16 60

Steel.—At the recent billet pool meeting the most important action taken was with reference to raising the carbon analysis on Bessemer steel. According to the former schedule an advance of $1 per ton was charged for carbon from .21 to .60 but the base price will hereafter rule on carbons up to .25, and from .26 to .60 the regular advance of $1 per ton will be charged. This was done in order to let in the axle concerns on the base price as their specifications call for steel running from .22 to .23 in carbon. Little business is being done and the market continues quiet. We make the following quotations: Bessemer billets 4x4 inches and slabs up to and including .25 carbon, $27, Pittsburg, Wheeling or Valley, Johnstown, Ashland, Ky., Ironton, O., and Lorain, O.; .26 to .60 carbon, $1 advance, and .61 to 1.00 carbon, $2 advance; open-hearth billets up to and including .60 carbon, $28, and over .60 carbon, $29; billets smaller than 3⅞-inch and sheet and tin bars are $1 per ton extra; Bessemer rods, $35.50 to $36 and open-hearth are held at $1 advance.

Ferro-Manganese.—Domestic 80 percent continues to be offered to the trade at $49 per ton in carload lots, delivered at buyer's mill. Little foreign manganese is now being offered.

Spelter.—Prime Western grades are quoted at 5.73½c to 5.75c, Pittsburg, in carload lots.

Muck Bar.—The market continues very quiet, and good grades of muck are being offered at prices ranging from $29 to $30.

Skelp.—Iron skelp is being offered in this market at prices ranging from 1.55c to 1.60c, for both grooved and sheared. Steel skelp is held at 1.60c to 1.65c.

Rails and Track Material.—The railroads are doing little buying for delivery next year, and rail mills continue to operate on contracts placed nearly a year ago. The light rail trade is quiet. We make the following quotations: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 8 pounds, in carload lots, $39; less than carload lots, $40; 12 pounds, $32 to $32.50; 16 and 20 pounds, $30.50 to $31; 25 to 40 pounds, $30. Track material: Spikes, 2.05c to 2.10c; track bolts, square heads, 2.05c; hexagon heads, 2.65c; fish plates, 1.60c on orders accompanying large rail contracts, otherwise 2c to 2.10c is asked.

Bars.—Current demand for steel bars continues good, but all the orders placed are for small orders for prompt delivery. The bar iron market is very quiet and quotations range from 1.50c to 1.55c. We make the following quotations: Bessemer steel bars, 1.60c; open-hearth, 1.70c; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer, under 3 inches, 1.70c; over 3 inches, 1.80c; common bar iron, 1.50c to 1.55c, Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots.

Plates.—The market continues very quiet although there is a possibility that the steel car demand will be revived shortly, as a number of roads are anticipating placing such contracts within the next few weeks. Prices are firm and unchanged as follows: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plates more than 100 inches, 5c extra 100 pounds. Plate 3-16-inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5c extra a hundred pounds, for less than carload lots. Terms, net cash, in 30 days.

Structural Material.—The Wabash Railroad placed the material for its train shed with the Pennsylvania Steel Co. About 3,000 tons will be required. A contract for the station approach, calling for about 9,000 tons, will be placed shortly. The market generally is quiet and prices are unchanged as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Sheets.—A fair demand is reported from nearly all of the sheet mills and jobbers are buying in fair sized lots to fill out depleted stocks. Concessions continue to be reported, however, and quotations are as follows in 500-bundle lots and over: Black sheets, No. 28, 2.65c to 2.70c; No. 27, 2.55c to 2.60c; No. 26, 2.45c to 2.50c; Nos. 22 and 24, 2.35c to 2.40c; Nos. 18 and 20, 2.25c to 2.30c; Nos. 14 and 16, 2.15c to 2.20c; Nos. 10 and 12, 2.05c to 2.10c. Galvanized: No. 16, 2.55c to 2.60c; No. 18, 2.80c to 2.85c; No. 26, 3.30c to 3.35c; No. 27, 3.55c to 3.60c; No. 28, 3.80c to 3.85c; No. 29, 4.30c to 4.35c; No. 30, 4.45c to 4.50c.

Pipes and Tubes.—The demand for merchant pipe and tubing continues very good, and nearly all of the mills are securing sufficient business to operate in full. While concessions have been reported they are very slight and have not disturbed the general situation. We quote as follows in carload lots to consumers, f. o. b. Pittsburg, plus freight according to Tube Rate Book to destination:

MERCHANT PIPE.

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Wrought Iron Pipe. Black. Percent.	Wrought Iron Pipe. Galv. Percent.
⅛, ¼ and ⅜ inch	68	58	65	55
½ inch	70	60	67	57
¾ to 6 inch	75	65	72	62
7 to 12 inch	69	59	66	56
Plugged and Reamed				
1 to 4 inch	73	63	70	60
Extra Strong Plain End				
⅛ to 8 inch	67	57	63	53
Threads only	66	56	62	52
Threads and Couplings	65	55	61	51
Double Extra Strong Plain End				
½ to 8 inch	59	49	55	45
Threads only	58	48	54	44
Threads and Couplings	57	47	53	43

NOTE.—Orders for less than carload will be charged at 12½ percent advance. Extra and Double Extra Strong Cut Lengths, lower random discounts by 10 percent net for 6 feet and longer, and 15 percent net for 3 to 6 feet.

BOILER TUBES.

Steel.

	Percent.
1 to 1½ inches	45
2¼ to 5 inches	62½
1¾ to 2¼ and 6 to 13 inches	52½

Iron.

	Percent.
1 to 1½ inches	36½
2¼ to 5 inches	45½
1¾ to 2¼ and 6 to 13 inches	35½

CASING.

	S. and S. Percent.
2 to 3 inches	58
3¼ to 4 inches	60
4¼ to 12½ inches	63

Wire and Wire Nails.—The fall trade is up to expectations and nearly all of the mills are operating in full. Local mills report a good demand from the West for barb wire and wire products generally. Quotations are unchanged as follows: Wire nails, carload lots, to jobbers, f. o. b. cars, Pittsburg, $2; plain wire, carload lots, $1.90; barb wire, carload lots, $2.30; staples, carload lots, $2.20. Galvanizing 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel cut nails are quoted as follows: Carload lots, $2.15, and less than carload lots, $2.20, f. o. b. Pittsburg, plus freight to point of destination. Iron cut nails are $2.25 in carload lots and $2.30 in less than carload lots. Terms, 60 days, less 2 percent off in 10 days.

Merchant Steel.—The market generally continues quiet, but orders are more numerous than they have been for several months. The buying is, however, limited to small lots almost entirely. We make the following quotations: Turned cold rolled and ground shafting, 47 off in carload lots and 42 percent off in less than carload lots. Tire steel, 2.15c to 2.25c; spring steel, 2.25c to 2.35c; toe calk, 2.30c to 2.40c. Tool steel is quoted 7 cents and upwards, according to the grade.

Old Material.—Considerable heavy melting stock is now being offered for sale by steel mills that one year ago were discussing the advisability of bringing foreign material into this market on account of the shortage. On the other hand the railroads are not making any very heavy offerings as present prices do not tempt them.

Coke.—The blowing out and banking of furnaces during the next three months will result in throwing nearly a month's output of the Connellsville region back on the producers' hands. Whether the banking of the furnaces will result in the drawing of ovens remains to be seen but it is to be presumed that this will be done. Connellsville furnace coke is held at $2 to $2.25, while foundry is quoted at $2.75 and $3. Outside coke is held at $1.50 to $2 for furnace and $2 and $2.50 for foundry. The production of the upper Connellsville region for the week ending Saturday, Sept. 19, amounted to 247,056 tons while that of the lower region amounted to 53,035 tons.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, Sept. 29.

Demand for metals in this market continues in about the same proportion as formerly, no changes of importance having been developed during the week under review. It becomes increasingly evident that Southern furnaces will be unable to maintain for long the differential of $1 a ton in pig iron in favor of Eastern foundrymen, and the cut rate will either have to be discontinued or allowed to Western melters before there will be any marked improvement in the local situation. A number of large consumers have tried to buy their pig iron in Eastern markets, requesting shipments to Western points, but furnaces have refused to grant the privilege, insisting on shipping the iron to the city from which the order came. This course has further antagonized melters in this section and added to their determination not to buy under present conditions. In the meantime, independent producers are actively seeking orders in this market, and according to reports are quoting prices ranging from $11.35 Birmingham for No. 2 foundry to 25 and 50 cents below that figure. A better demand has come up during the week for black sheets, the stove trade being the heaviest buyers. Plates are without change, specifications and new business being light. An improvement is noted in the volume of specifications for iron and steel bars, though prices are no stronger. Reports are current that the price of steel bars is being shaded $1 to $1.50 a ton, but these cannot be traced to any responsible source and are denied by all the leading producers. Heavy rails have been bought during the week in lots as high as 2,000 tons, but the aggregate tonnage booked is not large. Light rails and track supplies are active, a good business having been done in bolts and nuts. The demand for wire products shows no diminution, though reports that circular prices are being shaded continue. Billets are in fair demand in small lots at established prices. A sale of 3,000 tons of wire rods was made to a Western mill several days ago, the price reported being $35 per ton f. o. b. point of delivery. Foundry and furnace coke is moving freely at prices ranging from $2.75 to $3.25 at Connellsville ovens for the former, and $2.15 for the latter. Scrap shows no improvement and further declines are expected.

Pig Iron.—Buying in small lots is yet the rule, and there appears to be no disposition on the part of foundrymen to change it. Occasionally, a contract covering several months' requirements is placed, but these are exceptional cases and ordinarily they do not run over 500 tons. Western melters are no more favorably disposed today to the present basis of Southern values than they were when these were announced, and the differential of $1 a ton accorded Eastern foundrymen has only served to widen the breach. Independent furnaces are again becoming active in this market, and a quotation as low as $10.65 Birmingham is reported to have been made by one of these to a local consumer on a 500-ton contract. Considerable variance is noted in reports in circulation regarding the prices quoted by independent producers. Naturally buyers are anxious to buy at the lowest price and are seeking to press their present advantage. It is generally understood that independent iron is being offered openly in this market at $11.25 Birmingham, and in some cases as low as $11. Northern irons are suffering alike with standard Southern grades from the influences at work in the market and are booking only a carload business. We have revised some of our prices, and quote as follows:

Lake Superior charcoal	$18 00 to 19 00
Local Coke Foundry No. 1	17 00 to 17 50
Local Coke Foundry No. 2	16 50 to 17 00
Local Coke Foundry No. 3	16 00 to 16 50
Local Scotch Foundry No. 1	17 00 to 17 50
Southern Coke No. 1	16 10 to 16 85
Southern Coke No. 2	15 60 to 16 35
Southern Coke No. 3	15 10 to 15 86
Southern Coke No. 4	14 60 to 15 35
Southern No. 1 soft	16 10 to 16 85
Southern No. 2 soft	15 60 to 16 35
Southern Gray Forge	14 60 to 15 10
Southern Silveries (4% to 5% silicon)	18 35 to 18 85
Southern Silveries (5% to 6% silicon)	18 85 to 19 35
Jackson Co. Silveries (6% to 8% silicon)	20 30 to 21 30
Jackson Co. Silveries (8% to 10% silicon)	21 30 to 22 30
Ohio Strong Softeners	21 00 to 22 00
Alabama and Georgia Car Wheel	25 35 to 26 35
Malleable Bessemer	17 00 to 17 50
Basic iron	16 35 to 17 35

Billets.—New business has been light during the week, carload orders being the rule. A sale of 3,000 tons of

wire rods was made to a Western manufacturer several days ago, the price being $35 f. o. b. at point of debarkation. Prices of billets are firm at $28 for Bessemer, $29 for open-hearth, and $32 for forging, in carload lots, Chicago delivery. Open-hearth forging billets out of store are quoted 60c to $1.70 per 100 pounds.

Bars.—Specifications of both iron and steel bars have been received in increased volume by all mills during the past week and the outlook is brighter than for some time past. Reports are current that steel bars are being shaded from $1 to $1.50 a ton, but these are denied by producers; it is reported also that in some sales the price is guaranteed against declines. New business in iron bars, while not of very large tonnage, is yet encouraging, coming from all branches of the consuming trade. Buyers generally are purchasing only in small lots, though their orders come in with remarkable regularity, which indicates no great decrease in consumption. We quote mill shipments, carload lots, Chicago delivery: Iron, 1.50c to 1.55c; Bessemer steel, 1.76½; angles less than 3x3, 1.86½c base; hoops, in lots of 250 tons and greater, 2.06½c; less than this amount, 2.16½c. Quotations from warehouse stocks: Iron, 1.75c for car lots, and 1.85c for less quantities; steel, 1.90c for car lots and 2c for less quantities, rates; hoops, 2.30c to 2.40c; angles, 2.10c rates.

Sheets.—Buying has been better than for some time past, the greater part of the increased tonnage coming from the stove trade. Prices, however, are still weak and much competition exists for the business offered. We quote black sheets, mill shipments, f. o. b. Chicago, No. 27, 2.66½c to 2.76½c; No. 28, 2.76½c to 2.86½c. Galvanized from mill, carload lots, Chicago delivery, 75 and 10 to 75 and 10 and 2½ percent. On lots from store, we quote No. 27 black, 2.90c to 3c; No. 28, 3.05c to 3.15c; galvanized 75 to 75 and 5 percent.

Plates.—There is no change to report, the market being very dull. Specifications are slow. We quote mill shipments, Chicago delivery: Tank steel, ¼ inch and heavier, 1.75c; flange steel, 1.85c. Prices for lots from stock, tank steel, ¼-inch and heavier, 2c to 2.10c; 3-16, 2.10c to 2.15c; No. 8, 2.15c to 2.20c; No. 10, 2.30c to 2.35c; flange steel, 2.40c to 2.50c.

Structural Material.—While specifications are of fair volume, new business has little or no life. Some movement is reported from jobbers, but the total tonnage is not large. We quote mill shipments, Chicago delivery, as follows: Beams and channels, 16 inches and under, 1.75c; 18 inches and over, 1.85c; universal plates, 1.75c; angles, 3x3 and larger, 1.75c; tees, 3x3 and larger, 1.80c; zees, 1.75c. Lots from store, 2.10c to 2.25c per 100 pounds, rates.

Merchant Steel.—Orders continue to be placed with mills for season requirements. No large purchases are reported, but the total of the week's sales compares favorably with that of the weeks preceding. We quote mill shipments, Chicago delivery, as follows: Spring steel, 2.65c to 2.75c; sleigh shoe, 1.95c; flat sizes, concave and convex, 2.25c; cutter shoe, 2.50c to 2.60c; machinery steel, 2.15c to 2.25c base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.35c to 2.45c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; special, 13c and upwards; less than carload lots, 5 and 10 percent higher; cold rolled shafting, carload lost, 47 percent off; less than carload lots, 42 percent off.

Merchant Pipe.—Jobbers and consumers continue to place orders freely, and mills are reported to be sold some distance. We quote carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ to ⅜ inch inclusive	66.35	56.35	68.35	53.35
½ inch	68.35	58.35	65.35	55.35
¾ to 6 inches	73.35	63.35	71.85	61.85
7 to 12 inches inclusive	67.35	57.35	64.35	54.35

Less than carload lots, 12½ percent advance over above prices.

Boiler Tubes.—New business is of fair volume, the trade freely covering for requirements during the winter. Prices are without change, mill deliveries, carload lots, being as follows:

	L. W. Steel. Percent.	C. C. Iron. Percent.
1 to 1½ in.	48.35	38.35
1¾ to 2½ in.	55.85	35.85
2¾ to 5 in.	60.85	45.85
6 to 13 in.	55.85	35.85

For lots direct from warehouse stock:

	L. W. Steel. Percent.	C. C. Iron. Percent.
1 to 1½ in.	40	35
1¾ to 2½ in.	50	32½
2¾ to 5 in.	57½	42½
6 to 13 in.	50	32½

Cast Iron Pipe.—Manufacturers report that orders for small lots are very numerous and keep all the plants busy filling same. We quote carload lots, f. o. b. Chicago, 4-inch pipe, $30; 6-inch and upwards, $29; gas pipe, $1 a ton higher.

Rails and Track Supplies.—The week's sales of standard rails include some orders for as high as 2,000 tons, though the majority are for smaller tonnages. Light rails and track supplies are very active, jobbers having purchased heavily for bolts and nuts. Prices are without change. We quote standard sections, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality rails, $27; 25-pound rails, $32 to $34; 12-pound rails, $39 to $40, with regular differentials for intermediate sizes. Track supplies, mill shipments: Angle bars, 2c to 2.10c; spikes, first quality, 2.20c (out of store, carload lots, 2.25c to 2.35c rates); second quality, 2.10c; track bolts, 3½x¾ with square nuts, 2.85c to 3c per 100 pounds; with hexagon nuts, 3c to 3.10c, with usual differentials for other sizes.

Wire and Wire Nails.—A good demand continues for all kinds of wire products and mills are rapidly selling their capacity for the balance of the year. Reports continue to be circulated that prices are being shaded, though these are denied by the leading producer. We quote prices to jobbers, Chicago delivery: Wire nails, carload lots, $2.20; less than carload lots, $2.30. Cut nails, steel, carload lots, $2.26½; less than carload lots, 2.36½. Plain wire, $2.10 carloads, and $2.20 in small lots; galvanized, carloads, $2.40; smaller lots, $2.50. Barbed wire, carloads, $2.50; less than carloads, $2.60; galvanized, carloads, $2.80; less than carloads, $2.90; staples, carloads, $2.30; smaller lots, $2.40; galvanized, carloads, $2.60; small lots, $2.70. Bale ties, 82½ and 5 percent discount f. o. b. Waukegan on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or DeKalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

Coke.—A good demand has been noted during the week for furnace coke, and several large contracts have been let. Foundry coke is moving freely, buyers, generally speaking, showing no hesitancy in covering for their requirements. Standard 72-hour Connellsville coke is offered in this market at prices ranging from $2.75 to $3.25 at the ovens; 48-hour Connellsville, $2.15 at the ovens. Virginia and West Virginia grades, $5.15 to $5.40 Chicago.

Old Material.—Demand for scrap is of a light nature, though material is being freely offered by country dealers. It is the opinion of many that prices have not yet reached the bottom, and further declines are expected in the near future. Local merchants are purchasing only such material as they need for completing contracts. Nearly all the mills have large stocks in their yards. We quote dealers' selling prices, gross tons, as follows:

Old iron rails	$17 00 to 17 50
Old steel rails (mixed lengths)	13 50 to 14 00
Old steel rails (long lengths)	16 00 to 16 50
Relaying rails	24 50 to 25 50
Old wheels	17 00 to 17 50
Heavy melting steel	13 00 to 13 50
Mixed country steel	11 00 to 11 50

The following are selling prices for net tons:

No. 1 R. R. wrought	$16 50 to 17 50
No. 2 R. R. wrought	12 50 to 13 00
Shafting	14 50 to 15 00
Dealers' forge, No. 1	12 00 to 12 50
No. 1 busheling and wrought pipe	11 00 to 11 25
No. 1 cast	13 00 to 13 50
Heavy cast (300 pounds and over)	10 00 to 10 50
Agricultural malleable	13 00 to 13 50
Iron axles	18 50 to 19 00
Steel axles	16 50 to 17 00
Cast borings	5 00 to 5 50
Mixed borings, etc.	5 00 to 5 50
Wrought turnings	10 00 to 10 50
Machine shop turnings	10 00 to 10 50
Iron axle turnings	10 75 to 11 25
Steel axle turnings	10 00 to 10 50
Stove plate and light cast scrap	10 00 to 10 50
Old iron splice bars	14 25 to 15 00

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Sept. 29.

The settlement of the trouble between the Pittsburg Steamship Co. and its masters and mates on the terms stated in another column was unexpected, as it was not expected that the company would grant the demands of the men, but this decision seemed necessary because other vessels, having many contract obligations for hauling ore, grain, coal and lumber, did not feel that they could support the steel corporation in the position which it expected to take, thus causing a general suspension of navigation. Since the re-entry of the corporation fleet, there has been great activity among vessel owners, including the Pittsburg Steamship Co., in getting cargoes, all endeavoring to keep their boats busy and all afraid that they will not be able to do so. Shippers have not, however, made any effort to reduce freight charges, which are stationary. It is expected that the shipments of ore for September will show a large decrease as compared with last year. Many mining companies have reduced the number of their miners.

Pig Iron.—There has been a pleasing number of inquiries this week, some of them for lots of several thousand tons. The sales are not large, but the market shows no indication of further weakness. The announcement of probable banking of blast furnaces has had a tendency to make prices firmer and to set buyers to thinking. Some of the Southern furnaces are declining to accept orders below $11.75, Birmingham, but the usual quotation is $11.50 and better could be done on a large order. Southern Ohio is selling at $14.50 at the furnace, while the ordinary quotation in the Valley on small lots is $15. We quote as follows for Cleveland delivery, save on gray forge, which is at Valley furnace:

Bessemer	$16 35 to 16 85
No. 1 Strong Foundry	16 00 to 16 25
No. 2 Strong Foundry	15 25 to 15 75
No. 3 Foundry	15 00 to 15 25
Scotch No. 1	16 00 to 16 25
Scotch No. 2	15 25 to 15 75
Gray Forge, Valley furnace	13 75 to 14 00
Lake Superior charcoal	18 00 to 18 50

Finished Material.—There has been a determined effort among sellers in this territory to check the downward tendency of bar iron and some have missed sales rather than reduce their quotations below 1.45c at the mill. There are rumors of sales below that figure. While some buyers are considering the advisability of substituting iron for steel wherever either can be used, this change is reluctantly made, as was the substitution of steel for iron, when iron was commanding higher prices than steel. The price of steel bars is unchanged, 1.60c for Bessemer and 1.70c for open-hearth, Pittsburg. If there is any cutting on the price of plates, it evidently comes from parties not in the agreement. There is so little business in sheets that it is not known whether the independents are cutting the prices of the principal producer. On sales made through jobbers, the prices for the principal products are unchanged as follows: Galvanized sheets, mill sales, carload lots, Nos. 10 and 11, 2.60c; Nos. 12 to 14, 2.70c; Nos. 18 to 21, 3c; Nos. 22 to 24, 3.20c; Nos. 25 and 26, 3.55c; No. 27, 3.80c; No. 28, 4.05c; No. 29, 4.45c; No. 30, 4.95c. Galvanized sheets out of stock are quoted 75 and 5 off. For 3-16-inch black sheets and heavier we quote 2.15c, Cleveland. Mill sales of black sheets to consumers are made on the following basis: No. 24, 2.65c to 2.75c; No. 26, 2.75c to 2.85c; No. 27, 2.85c to 2.95c. The following are prices out of stock: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.50c to 2.60c; No. 16, 2.60c to 2.70c; Nos. 18-20, 2.75c to 2.85c; Nos. 22-24, 2.85c to 2.95c; Nos. 25-26, 2.95c to 3.05c; No. 27, 3.05c to 3.15c; No. 28, 3.15c to 3.25c.

Old Material.—The fact that concerns which make scrap and have it for sale are, as a rule, in operation while some of those which buy scrap are idle or running only on half time, has depressed the market and lower prices in nearly all kinds of old material rule in the few transactions taking place. We quote the following, gross tons, Cleveland:

Old iron rails	$18 00 to 19 00
Old steel rails (over 6 feet)	16 00 to 17 00
Old steel rails (6 feet and under)	15 00 to 16 00
Old car wheels	17 00 to 18 00
Steel boiler plates	12 00 to 13 00
Malleable iron (railroad)	14 00 to 14 25
Malleable iron (agricultural)	12 00 to 13 00
Heavy steel	13 00 to 13 50

We quote the following net tons:

No. 1 R. R. wrought	$14 00 to 15 00
Mill scrap	14 00 to 14 50
No. 1 machine cast scrap	12 50 to 13 00
Iron axles	19 00 to 20 00
Axle turnings	12 00 to 13 00
Wrought turnings (free from cast)	10 00 to 10 50
Uncut wrought iron boilers	9 00 to 10 00
Grate bars	10 00 to 11 00
Pipes and flues (clean)	12 00 to 13 00
Tank iron	12 00 to 13 00
Hoop and band iron	9 00 to 10 00
Sheet iron	7 00 to 8 00
Wrought drillings	10 00 to 10 50
Stove plate	10 00 to 10 50
Steel axles	20 00 to 21 00
Cast borings	6 00 to 7 00

CINCINNATI.

Sept. 29.

The coke market has been quiet the past week but prices have been about steady and unchanged. The prevailing quotation is $3 for the best brands, and some are held at $3.25, but there are offerings as low as $2.75 f. o. b. ovens.

Pig Iron.—The developments the past week have been interesting and lower prices have been established. Sales have been made on the basis of $11, Birmingham, and it is current talk that $10.75 has been done. It is announced that the association of Southern furnaces will hold another meeting on Oct. 2 in Birmingham, and what may be done is a subject of general speculation. One of the sales agents of an important furnace company, member of the association, has sent out a letter inviting offers of business on the basis of $10.75, Birmingham, and this is construed by the trade to mean that the differential basis between Eastern and Western territory is to be abolished. Independent furnace interests have already gone to $11. Buyers are not inclined to purchase or make a tender of business at any figure now, as in the past the independent furnaces have undersold the association each time the latter announced a basis. The demand has come to a standstill and only immediate need brings a buyer into the market. Mails are lighter than for some time and the market is dull. Indications also point to a falling off in the consumption of pig iron. Under present conditions quotations are difficult to locate and the trade is somewhat perplexed. Pending awaiting action by the association at its meeting but little can be expected to develop, as buyers and sellers are both waiting. The following are the prices current, f. o. b. Cincinnati:

Southern Foundry No. 1	$14 75 to 15 25
Southern Foundry No. 2	14 25 to 14 75
Southern Foundry No. 3	14 00 to 14 50
Southern Foundry No. 4	13 50 to 14 00
Southern Foundry No. 1 soft	14 75 to 15 25
Southern Foundry No. 2 soft	14 25 to 14 75
Gray forge	13 25 to 13 50
Northern Foundry No. 1	16 40 to 16 65
Northern Foundry No. 2	15 90 to 16 15
Northern Silvery (8% silicon)	18 65 to 19 15
Southern car wheel iron	26 25 to 27 25

Finished Material.—The demand in a jobbing way has been fairly good but there is not much in the way of large orders doing. Any good sized inquiries bring out strong competition between jobbers and mill agents. Prices are not quotably changed but there is an easy tone

and concessions are not difficult to obtain. Prices for bar iron continue irregular and on car lot orders 1.55c to 1.60c f. o. b. Cincinnati are the ruling quotations. Steel bars remain at 1.73c base, half extras, with the retail price 1.90c for iron and steel out of store. Galvanized sheets are being quoted at 75 and 10 percent off. We quote black sheets No. 27 at 2.78c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 3.05c; No. 27, 2.95c; No. 16, 2.55c; No. 14, 2.45c; No. 12, 2.40c; No. 10, 2.30c. Tank plates are firm and sell out of store at 2.05c for ¼-inch and 2.15c for 3-16-inch. Beams and channels are quoted at 2c from stock, and angles at 2c for base sizes. The merchant pipe market remains steady and there is a good demand. On large sizes deliveries are reported as slow but the smaller sizes are in fair supply.

MERCHANT PIPE.

(Basing Discounts.)

	Steel Pipe.		Guaranteed. Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛, ¼, ⅜ inch	66.7	56.7	63.7	53.7
½ inch	68.7	58.7	65.7	55.7
¾ to 6 inch, inclusive	73.7	63.7	70.7	60.7
7 to 12-inch, inclusive	67.7	57.7	64.7	54.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1½ inch	41.2	35.2
1¾ to 2½ inch	54.2	34.2
2¾ to 5 inch	59.7	44.2
6 to 13 inch	54.2	34.2

Old Material.—The market is dull and easy with quotations irregular. We quote the market nominally as follows, demand being very light:

Old No. 1 railroad wrought, net tons	$14 00 to 15 00
Cast machine and foundry, net tons	12 00 to 12 50
Old iron rails, gross tons	19 00 to 20 00
Old steel rails, gross tons	17 00 to 18 00
Old short lengths, gross tons	14 50 to 15 50
Old iron axles, net tons	20 00 to 21 00
Stove plate, net tons	9 00 to 9 50
Wrought turnings, net tons	11 00 to 11 50
Cast borings, net tons	6 00 to 6 50

PHILADELPHIA.

Sept. 29.

Evidence accumulates that considerable time will be required to restore confidence in the iron trade. High prices resulted in such large production that the supply is far in excess of the demand and prices still tend downward. Although there is talk of a general blowing out of furnaces, the curtailment of product is not yet considerable. Labor has established wages which can not be maintained and the outlook is that the question will be one of work rather than of wages. Business is not, however, dead by any means, and a little more activity soon is expected.

Pig Iron.—Sales have been somewhat heavier, but there is no special significance in the slight change. Many furnacemen say they will blow out rather than go below $16 for No. 2 X foundry. Prices are hardly quotable except for small lots, which are about as follows: No. 1 X foundry, $17 to $17.50; No. 2 X foundry, $15.75 to $16.50; No. 2 plain, $15.25 to $15.50; standard grey forge, $14.75 to $15; ordinary gray forge, $14 to $14.50; basic, $14.50 to $15.

Steel.—There is not much demand for steel and buyers hardly know what price to bid. For desirable business, sellers would be glad to get $27. Foreign sells at a dollar less.

Finished Material.—The closing down of a number of mills shows the slack demand for finished material. Nearly all the mills are running on short time and prospects are far from encouraging. We quote: Best refined bar iron delivered, $1.50 to $1.60; tank plates, steel delivered, $1.75 to $1.80; angles, delivered, $1.75 to $2; beams, channels for 15-inch and over, $1.75 to $1.90.

Old Material.—Market for steel scrap is depressed by the closing of the works at Pencoyd. Prices are nominal, about as follows, for delivered scrap: Old steel rails, $15.50 to $16; miscellaneous heavy steel, $15.25 to $15.50; low phosphorus scrap, $23 to $25; old steel axles, $18 to $19; old iron axles, $20 to $21; old iron rails, $18.50 to $19; old car wheels, $17.50 to $18; choice railroad No. 1 wrought, $16.50 to $17.50; country scrap, $14 to $15; machinery cast, $14 to $15; No. 2 light scrap, forge, $14 to $15; No. 2 light scrap, ordinary, $10 to $11; wrought turnings, $10.75 to $11.25; wrought turnings, choice heavy, $12 to $12.50; cast borings, $7 to $7.75; stove plate, $11 to $11.50.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., Sept. 29.

Pig Iron.—While buyers are still continuing to provide for their requirements only as necessity demands, more of them have been in the market during the past week. The opinion is that the list of consumers who have no iron on hand is gradually getting larger, and a steady trade is thought likely from now on, although nobody expects it to be of any great proportions.

The announcement that Eastern furnaces are engaged in trying to effect a systemetic restriction of the production, is received with much favor. Another meeting of the furnaces will be held in this city tomorrow, and the chief matter for discussion is the propriety of curtailing the production by 20 percent, which would aggregate 1,000 to 1,200 tons daily. It is believed that the plan will be approved, but there are some furnaces who will oppose it. While similar action on the part of Southern interests would be welcomed, opinion here is that a uniform agreement in that direction could not be reached. At least half a dozen furnaces in the East have reduced the wages of their employees 10 percent. These furnaces are removed from labor centers, but other furnaces are thought to be in for similar treatment, as the belief is strengthening that any attempt to decrease the cost of production must include wages. Standard brands of Southern irons are now selling in this market for about $1.50 less than Northern irons. New York prices are as follows: Northern No. 1 X foundry, $17 to $17.25; No. 2 X, $16.50 to $17; No. 2 plain, $16 to $16.50; Southern No. 1 foundry, $15.75 to $16; No. 2 foundry, $15.25 to $15.50; No. 3 foundry, $14.75 to $15; No. 4 foundry, $14.25 to $14.50.

Finished Iron and Steel.—All branches of the finished material market are quiet. In structural shapes there is a decided hesitancy about closing contracts, particularly where large propositions are involved. Generally at this time railroads are heard from in connection with their bridge requirements for next year, but no orders are being received from them. Several Western roads have written that they will not give their orders until the financial situation clears. Many building enterprises are either being postponed, or called off indefinitely, on account of inability to procure capital. Structural material makers have interchanged views recently regarding a reduction of prices, but the belief is strong that any concerted action in that relation, would do more harm than good. The experience of Southern pig iron producers is cited in evidence.

Only one bid was received for Blackwell's Island bridge. The fact occasioned no surprise, as the estimate of the city authorities, which was made in 1899, would invite loss, not to say anything of the three year limit of time allowance and penalties. The specifications will be readvertised, with a bonus incorporated in them. Sheets are extremely dull, and a large jobber says no Eastern buying would take place, even if prices were reduced, on account of the labor situation. Bars are very unsettled, and the prospective buyer is apt to be confronted with a variety of prices. The orders placed cover a small tonnage. In plates new contracts are very scarce, and a recession in prices is thought likely. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 1.79c to 1.86c; flange, 1.90c to 2.10c; firebox, 2.10c to 2.20c; refined iron bars, 1.60c to 1.80c; soft steel bars, 1.70c to 1.75c; steel sheets, in carloads, New York, No. 28, 2.90c to 3.05c; galvanized, 75 and 75 and 2½ off.

BIRMINGHAM, ALA.

Sept. 29.

It is difficult to sum up the present state of the iron market as it appears from this point of view. Buyers are almost unanimous in their expressions that the price will still go lower, whereas the makers argue that in view of the fact that many buyers are requesting all deliveries hurried through, stocks in consumers' yards are in many instances very small, and that in a short time there must be a reaction, particularly when the plans of Northern furnaces for banking are carried out. The result is very little buying, while prices remain as quoted for some time, usually $11.75 f. o. b. Birmingham, with occasional concessions to a particular customer to meet prices made by a producer having the advantage in freight rates. Such prices have been made to Eastern buyers to meet the competition of Virginia furnaces, which have a decided advantage in the rate of freight. There is a probability of the blowing-in of some stacks being delayed in event there is no immediate improvement in prices, and it is generally believed that even at present prices, with no great buying movement soon, many stacks will be compelled to bank, as it will not pay to accumulate large stocks on the yard, with the present high cost of production.

VIOLENCE AT THE CANADIAN SOO.

The past few days have been eventful in the history of the Consolidated Lake Superior Co. Last week, Speyer & Co. announced that on Oct. 1, at noon, they would sell the property of the company at public auction at No. 161 Broadway, New York, to satisfy a claim of $5,050,000 held by their syndicate. This proposed sale has, however, been stopped by proceedings in the United States district court at New Haven, Conn., where, on Sept. 28, John G. Carruth, president of the International Title & Trust Co., was appointed receiver. The application for the receivership was presented by Judge Walter C. Noyes in behalf of P. H. Rothermel, Jr., Samuel M. Clement, Jr., and Joseph DeF. Junkin of Philadelphia, attorneys for certain stockholders of the company. It was set forth in the application that the directors of the company had failed to take up the loan of $5,050,000 of Speyer & Co., of New York; that the actual value of the plant as expressed in the amount expended in buildings, machinery and other properties, is far in excess of the amount of the loan; that the stockholders fear that if a forced sale were allowed, they would lose the entire amount of their investment. A receiver was therefore asked for and also a temporary injunction to prevent the sale of the property under foreclosure proceedings.

Employes of the company at the Canadian Soo are having trouble in getting the necessaries of life, as they were paid in checks, which no one will cash. William Coyne, assistant to President Shields, said that after keeping the horses of the company on low feed for a few days, and the stock being at last entirely exhausted, he was compelled, in order to keep his animals alive, to trade a cart for six tons of hay. Many of the miners and lumbermen have arrived at the Soo, and some have found employment, while others are being assisted by company officials in getting enough food to maintain life. There has been much disorder at the Canadian Soo this week. Angered employes stormed the offices of the company, threatened to kill the officials, and resorted to many acts of violence. Police have been unable to stop the rioting, and troops have been called out.

P. F. Rothermel and Samuel Clement, Jr., of Philadelphia, and John R. Dos Pasos, of New York, representing the committee of Philadelphia stockholders in the Consolidated Lake Superior Co., had a conference in New York Sept. 29, with counsel for Speyer & Co., and arranged to have the sale of the property, which had been set for Oct. 1, postponed until Oct. 8. In the meantime negotiations will continue with the view of effecting a compromise.

At Grand Rapids, Mich., Sept. 29, upon application of the Central Trust Co., of New York, holding a mortgage for $2,400,000 on the property of the Michigan Lake Superior Power Co., one of the Clergue industries, Judge Wanty, of the U. S. district court, appointed B. F. Fackenthal, Jr., of Easton, Pa., president of the Thomas Iron Co., receiver of the company. Mr. Fackenthal some time ago made a thorough inspection of the properties of the company at the instance of Speyer & Co.

OBITUARY.

Charles Davis, several years ago a prominent figure in the machine tool trade of the Central West, died at the home of his mother in Clifton, Cincinnati, Sept. 25, aged 50. Educated at the Chickering Institute and the Pennsylvania Military Academy at Chester, Pa., he began his business career very early with the firm of Bart & Hickox. He soon developed marked business ability, and after several years in the wholesale drug and druggists' sundries business embarked in that of manufacturing machine tools, his first experience in this line being with Lodge, Davis & Co. He then organized the Davis & Egan Machine Tool Co., which was succeeded by the American Tool Works Co. He was a pioneer in developing the manufacture of machine tools in Cincinnati on a large scale, and his efforts contributed much to the building up of the

CHARLES DAVIS.

foreign trade in American machine tools, which was so large a factor in the business in the years following the panic of 1893. Mr. Davis traveled extensively in England, France and Germany, and made large sales of tools in the middle 90's. A few years ago his health failed, the result of overwork, and he went abroad for two years, returning much improved. Latterly he had been engaged in real estate operations. Mr. Davis was recognized as one of the most capable of Cincinnati's business men, and had been active in its Manufacturers', Commercial and Queen City clubs. He had literary ability of no ordinary degree, and his stories and narratives based upon personal experiences in travel have been much commented upon.

Maj. S. W. Hay, Pittsburg, representative of the Whiting Foundry & Equipment Co., met with a fatal elevator accident at Pittsburg on Tuesday afternoon, Sept. 29, in the Arrott building. He was 56 years old on the day of his death. For the past fifteen years Maj. Hay has visited the foundry trade in the Pittsburg, Valley and Cleveland districts in the interest of the Whiting company and he enjoyed a wide acquaintance throughout his territory. He is survived by his wife and three children.

W. L. Davis, a traveling salesman for the United States Cast Iron Pipe & Foundry Co., Chicago, committed suicide at his home in Chicago Tuesday evening, Sept. 22, while temporarily insane. Mr. Davis had been connected with the United State Cast Iron Pipe & Foundry Co. since its organization, having formerly been a salesman for the Addyston Pipe & Steel Co., and previous to that with Matthew Addy & Co., Cincinnati, Ohio.

James Cullen, who for years was one of the proprietors of the Fairmont Steel Works, Philadelphia, died on Sept. 14, aged 71 years. For years he furnished steel for making dies in the United States mints.

Robert L. Hurst, 67 years old, died at his home in Pittsburg, Sept. 20. He had long been in the employ of the Carnegie Steel Co., and was an expert in the handling of ore.

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G. H. GARDNER, President and Treasurer,
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A. I. FINDLEY, Secretary.

A. I. FINDLEY, - - - - - - - - - EDITOR.
ROBERT I. CLEGG, - - EDITOR MACHINERY DEPARTMENT.
GEORGE SMART, - - - - - ASSOCIATE EDITOR.

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OUR NEARNESS TO A GENERAL EXPORT MOVEMENT.

One does not readily see how near the American iron trade is to exporting large quantities of various finished and semi-finished products on account of two or three beclouding factors. Previous export movements occurred at times when the domestic trade was very far from prosperous, with prices very low, and it is natural to assume that such conditions as happened to exist at such times were necessary conditions. They were necessary only in that manufacturers then required a wide leeway in order to encourage the taking of such a radical step. It is natural also to form a judgment off-hand that the small imports in times of exceptional prosperity are due wholly to our high tariff, and not to foreign prices being fairly high also. As a matter of fact, the tariff in recent years has shut out a comparatively small tonnage, although this tonnage might have been very disturbing had it come in.

Taking the whole range of values and costs here and abroad, from ore and coke at one end to the cost of the last operations in finishing such products as wire nails, merchant bars, etc., we stand in a very favorable position. Beginning with ore, it is to be noted that present ore prices contemplate a free return to the ore company of something like a clear $2.00 for every ton that is taken out of the ground, yet the ore cost per ton of pig iron is little if any higher in furnaces contiguous to the lakes than to furnaces in Great Britain. With 63 percent Mesabi ore at $4.00 at lower lake docks, the cost per ton of pig iron is only a trifle above $6.00. We have the record of a South Wales producer of Bessemer pig iron from Spanish ore, showing 23,808 tons of ore for 13,406 tons of pig, or 1.78 tons of ore per ton of pig. Such ore is now quoted at 14s 6d at Cardiff, equal to $6.28 per ton of pig. Its leanness makes up for the cheaper cost per ton. We have standard Connellsville coke at less than $2.75 delivered Pittsburg, while best furnace coke at Middlesbrough is quoted 15s 6d or $3.75, and in South Wales 18s or $4.38. With limestone at about the same price, iron ore per unit not appreciably higher, and coke higher per ton, the American furnace is certainly at clear advantage, since the purer ore requires less coke. The Welsh furnace just referred to used 17,467 tons of coke to make 13,406 tons of pig iron, or 2,900 pounds per ton. As the labor cost per ton of pig iron is from 75 cents to a dollar, modern American furnaces with automatic machinery are certainly at an advantage in this respect, and the older ones at no very great disadvantage.

In passing, it must be pointed out that the costs of American ore and coke above compared, involved a large return for the mineral in the ground as exhausted. A concern like the United States Steel Corporation, which has capitalized such minerals, would do very well—if it were necessary to export finished products at no profit—were it thus to turn its capitalized minerals into cash.

Nor are these British figures susceptible of any great reduction under the stress of hard times. We have before us detailed itemized costs at four coke works in the year 1897, the total costs, not including interest or taxes, the totals ranging from 7s 9.44d to 9s 1.32d, thus averaging a bed rock cost of over $2.00 per ton at ovens.

In the conversion of pig iron into steel the advantage of American works is well defined. Fuel in general is considerably higher and lower wages are fully offset by the greater amount of labor required. From the ingot to the final rolled form the elimination of labor is so complete in American practice that the labor cost per ton is much less. Massive continuous mills reduce the fuel consumption and the cost of other supplies. In all the history of the British iron trade finished rolled products have not once touched costs which have been common in the United States. The lowest point for Staffordshire "marked bars," comparable to our refined iron bars, was £7 or over 1.50c, in 1895 and 1896. Now they are £8 10s or 1.85c, while common iron bars are £6 10s or 1.41c. The lowest price of sheet bars in South Wales was £3 15s or $18.25, and of steel rails about the same. Steel plates never sold at a cent a pound in England as they have in the United States. Comparing the lowest price of American tin plate with the lowest price of Welsh tin plate, the former is the lower if one eliminates from the case not the total labor cost, but merely the excess of tonnage or skilled labor cost at the hot mill.

In the conversion of crude steel into such products as wire nails, wire fence, pipe, etc., the advantage on the American side is certainly apparent.

In building up an export trade there is a dead expense of exploiting new markets. It is certainly no disadvantage to the United States that so large a part of the trade is concentrated under one ownership, which can make expenditures freely in the knowledge that any trade which results is practically certain to accrue to itself, while with our trans-Atlantic competitors each producer must work for itself, with many competitors ready to snap up the fruits.

SOUTHERN IRONS IN NORTHERN MARKETS.

After 18 months of high prices for their product, the Southern blast furnaces are facing such competition from Northern furnaces as must compel serious consideration of the lines on which the foundry iron

trade is to move in the immediate future. It has been a checkered history—that of the sale of Tennessee and Alabama irons in the Eastern and Middle States, in many cases under the shadow of furnaces using rich and cheap Lake Superior ores and paying freight on a coke haul of but 75 to 150 miles. The original establishment of a market for the Southern softeners, as well as for the Southern foundry grades of a phosphorus content that made them mix well with the Lake irons, came at great sacrifice of profits by Southern furnacemen and at unusual concessions in rates by the railroads. That neither furnace companies nor railroads have grown rich out of the trade is so palpable a fact that there has never been a field for a de luxe volume giving the secrets of the business. The ground has been fought over with varying fortunes, the Northern furnaces now turning back the influx of Southern iron, under favorable prices for raw materials, and then in turn the Southern producers, with the help of their railroads, taking a fresh hold and greatly enlarging the sphere of their operations. The Eastern Pennsylvania furnaces have been particularly open to attack from Virginia irons, and have had no such relief as some Ohio and Western Pennsylvania producers have found at times in turning to Bessemer iron when the steel works demand made that operation possible.

In 1900, when the steel plant at Ensley started, the turning of so much of the Tennessee company's capacity to basic iron was looked to to work an important change in the situation, lessening the supply of Southern foundry iron and thus relieving the pressure of iron upon Northern markets and upon the export trade. But meantime new Southern furnaces have been built to enter the foundry iron trade and old furnaces have been rebuilt; the demand has grown apace, so that hundreds of thousands of tons of foreign iron have been required to meet it. Now, in turn, as the pendulum has been swinging back in the past three or four months, prices have fallen, profits have been disappearing for many, and the familiar appeal to the railroads for a lower freight has come again. In the East, where foundry iron furnaces constitute so large a factor of the furnace interests, special concessions are made by Southern sellers, and they are getting their share of the business. In the Central West local furnaces are underselling the South, and the prospect for the maintenance of the Southern trade seem not so promising.

As is well known, the building of Northern furnaces to make foundry iron has been an active industry in the past two years, particularly at lake sites, where the nearly two tons of ore needed for a ton of foundry pig, could be unloaded at a minimum freight. Ore and coal properties have been acquired to reinforce most of these projects, giving advantages that the merchant furnace regime has not known. That the supply of iron is likely to be more than ample in Ohio, Western Pennsylvania, New York and Southern Michigan—where Southern irons have gone freely in recent years—is a safe conclusion from the construction record. In the past year four furnaces have been erected in Ohio and Western Pennsylvania with an annual output of 400,000 tons, whose entire output of foundry and mill iron will be disposed of in the open market in direct competition with Southern irons, and except in instances where Southern irons are especially desired and required for mixtures, price will govern entirely. Three additional furnaces that will dispose of their product in the Central West are under construction with an annual output of 225,000 tons, and are expected to be blown in before many months. While it is true that consumption has greatly increased during the last year and a half by the erection of new foundries and rolling mills, and extensions to existing plants, nevertheless the combined consumptive capacity in the district mentioned has not increased sufficiently to absorb the output of seven new furnaces with a combined output of 625,000 tons.

The open-hearth plants in the Pittsburg and Valley districts that were large consumers of Southern basic until last year have with few exceptions provided for their iron by the erection of additional furnaces. Few new steel plants have been undertaken which did not include the erection of furnaces with a capacity sufficient to meet the requirements of the former, and the demand for Southern basic iron in the Pittsburg and Valley districts is extremely limited at present. During the past year there have been placed in operation no less than nine furnaces in the Pittsburg and Valley districts and Western New York, with an annual output of 1,600,000 tons, to meet steel works requirements, and within the next eighteen months there will probably be completed in this district 14 stacks with a combined annual output of 2,500,000 tons to furnish iron for steel works.

With this prospect, and even under existing conditions, it is not surprising that Southern pig iron producers should ask their railroads for freight reductions that will bring tariffs to what they were when iron was last sold on the basis of $11 Birmingham for No. 2. But back of freight concessions there is the whole line of cost factors that must stand revision if the Northern field is to be occupied to anything like the average of recent years.

DECREASED IMPORTS OF STEEL.

The report of the Treasury for August shows a slight increase in imports of pig iron as compared with July and a decided decrease in imports of steel. The imports of iron and steel for the first eight months of 1902 and 1903 were as follows in gross tons:

	1902		1903	
	Pig Iron.	Steel.	Pig Iron.	Steel.
January	7,883	5,312	110,679	38,691
February	8,307	2,235	45,187	20,151
March	17,184	6,570	59,628	31,464
April	19,067	11,986	99,944	29,014
May	30,708	24,380	57,139	26,389
June	32,458	35,588	79,874	30,530
July	62,156	37,150	38,046	33,070
August	79,447	39,027	40,475	20,380
	257,210	161,231	530,972	229,680

The decrease in imports of both iron and steel, as compared with August of last year is very large, but the total imports of iron for the eight months are about double those of the corresponding period in 1902.

C. E. Foust, for the past two years assistant manager for Rogers, Brown & Co., at Birmingham, Ala., has resigned to assume the position of assistant to the president of the Decatur Car Wheel & Mfg. Co., of that city.

Geo. L. Reis, vice president of the Lackawanna Steel Co., announces the appointment of John N. Allen as general purchasing agent of the company, with offices at the works at Buffalo.

Cincinnati Machinery Market.

CINCINNATI, O., Sept. 29.—Compared with the great activity in the machinery business of the first six months of the year, the month of September shows a falling off in the demand. This has not been unexpected and finds the manufacturer quite prepared for a decrease in the immense volume of orders that put every shop behind last year. The manufacturers knew that such a situation could not last, and now that there is a let-up, the shops are able to adjust their business to meet a more normal status of trade. There is nothing now that could be classed as dullness, as the shops are all running and most of them full time. There is no stock being accumulated and many old orders are yet unfilled.

Some increase is noted in foreign orders and the new types of machines being brought out and the improvements being made give confidence that these new and up-to-date machines will be wanted to take the place of old machines, the manufacturers of this country and of the world appreciating that shops must be kept up to date and every device bringing with it economy and efficiency will find a demand. In this city, where machine tools are so strongly specialized and where every effort is made to bring this special line up to its highest efficiency, the manufacturer does not view with alarm a falling off in demand for a period of thirty days. The causes which may be responsible for the present situation are variously diagnosed. The daily press is filled with news of a nature not calculated to encourage new enterprises, and the shrinkage in values of securities has caused capital to pause and study. Conservatism, however, is not alarming and the railroad earnings attest an enormous movement of traffic. With these facts in view, the machinery interests of this city are running right along, confident that the commanding merit of their product and the up-to-date methods they employ in their shops will put them in position to compete under any conditions that may arise.

The jobbing demand from the Eastern agencies is reported as quiet, but from the West more active inquiries are coming along. Builders of motors are busy with work ahead, and some finished work in the machine shops is delayed waiting for motors to be furnished. The manufacture of automobiles and the building of new plants for the construction of these vehicles is bringing in a new field of demand for machine tools.

The Fosdick Machine Tool Co. reports a good line of inquiries and its shop running full. Some foreign orders are coming in, notably from England and France. The company is bringing out a new combination machine which promises to be a success—a horizontal boring, drilling and milling machine.

The Lodge & Shipley Machine Tool Co. is running full time, and while it is conceded that there has been a falling off in the orders, there is still enough business in sight to keep the plant running without accumulating any stock to mention. The company has introduced many labor-saving devices and an elaborate system of stock room classification and facilities.

The John Steptoe Shaper Co. is running full with a fair run of orders and a good line of inquiries. The company reports the Western jobbing demand as fairly good and the inquiry from automobile factories as particularly noticeable in the general run of business.

The Rahn-Mayer-Carpenter Co. is running right along, but trade is reported as quiet compared with the boom period. There is plenty of inquiry, but general business conditions are such that buyers are inclined to hold off on their orders.

Greaves, Klusman & Co. are running full time with a full corps of hands, and still have orders ahead and a good line of inquiries and some orders for their new turret lathes.

The Cincinnati Milling Machine Co. is now fully installed in its new addition and the company is running with a full force of men. An improvement is noted in foreign orders.

Schumacher & Boye report some let-up in orders, but the plant is running full force and full time. They are getting enough business to keep things moving and some old orders are still unfilled.

The Cincinnati Fall Festival afforded an excellent opportunity for the visitors to this city to appreciate the importance of this locality as a manufacturing center for the building of machinery of all descriptions. In Machinery Hall these exhibits were displayed attractively and were an important feature of the festival. The exhibit included wood working machines by the J. A. Fay & Egan Co., electric motors by the Barriett Electric Co., steam pumps by the John H. McGowan Co., power punches by the Cincinnati Punch & Shear Co., gas engines by the F. M. Watkins Co., lathes by the Lodge & Shipley Machine Tool Co., milling machines by the Cincinnati Milling Machine Co., shapers by the Cincinnati Shaper Co., upright drills by the Cincinnati Machine Tool Co., radial drills by the Bickford Drill & Tool Co., a 400-h. p. engine by the Lane & Bodley Co., leather belting by the Bradford Belting Co., a number of machines of various makes by the E. A. Kinsey Co., jobbers of machinery and supplies, elevators by the Warner Elevator Co. The Fosdick Machine Tool Co. exhibited its new combined boring, drilling and milling machine. This exhibit attracted considerable attention and the machine was purchased by the Lodge & Shipley Machine Tool Co.

Dominion Iron & Steel Co. Statement.

The Dominion Iron & Steel Co. has passed the dividend on its preferred stock. The dividend was due on Oct. 1. The rate has been 8 percent. The common dividend was recently passed.

Directors Plummer, Nichols, McMaster and Ross, of the Dominion Iron & Steel Co., have prepared a report to the shareholders which says:

"Expectations with which your directors entered on the lease of the Dominion Coal Co. have unfortunately not been borne out. This is due partly to the heavy expenditure on the coal property, amounting up to July 31 to $1,682,968, partly to the falling off in earnings this summer, chiefly attributable to the fire in Dominion No. 1, partly also to the fact that the requirements of this company's business have rendered it less able to meet the capital expenditure for the coal business. In connection with its operations under the coal lease the company has paid or become liable for $2,725,346. Under the new arrangement the coal company will assume the current liabilities for pay rolls, supplies, etc., amounting to $590,346, so that debit against the coal department would be $2,135,000. This will be provided for (with $500,000 additional) by a payment from the coal company, under the arrangement mentioned.

"On the completion of the transaction the general liabilities of the steel company, which are now $4,484,961, would be reduced by the sum of $1,980,000, leaving liabilities of $2,504,961, against which there would be cash assets of $2,232,479. On completion of the present negotiations the company will enter on its future free from the financial responsibilities of the coal business, with its liabilities lessened by $2,635,000, and with $1,500,000 of new money (proceeds of $1,500,000 6 percent second mortgage bonds to be taken by directors at par) provided to complete its plant. A bill has been introduced into Parliament which when passed will benefit us by prolonging bounties. With the completion of the finishing mills and the washing plant and with suitable bounties or protection the company's iron and steel business should become permanently profitable."

The Standard Welding Co., of Cleveland, says that the business is holding its own and that the orders received for such mechanical tubing as is employed in the construction of machinery, the tubing being used for hollow shafting, oil conveyors, etc., would indicate that the machinery business is improving over the past three or four months.

The Labor Situation.

MOVING ON ACCOUNT OF LABOR TROUBLES.

The purchasing and traffic departments of the Allis-Chalmers Co., of Chicago, will be moved to West Allis, Wis., labor troubles being given as the cause of the removal. W. J. Chalmers, president of the company, said:

"We are consolidating the purchasing and traffic departments of our business at West Allis, Wis., just outside of Milwaukee. Sixty-six percent of that part of our business is done there now, and we think it economy to do all of it from there. During the last year we have spent $3,000,000 in buildings, machinery and tools at West Allis and are locating everything there as fast as possible. We own 186 acres of land there, and it is a convenient place for our business. We are compelled to make the change on account of labor troubles here in Chicago. It is impossible for us to secure protection, and there is no other alternative but to go elsewhere. During the recent strike, which lasted for thirteen months and cost us $350,000, we were unable to get police protection, and consequently we lost heavily. While there will not be any immediate change in the plants here in Chicago, yet one thing is certain, no more money will be invested with a view to increasing the capacity."

AN ANTI-BOYCOTT AND ANTI-PICKET ACT.

The force of public opposition to the boycott is being felt more strongly as it has been organized in various parts of the country. It has found emphatic expression in an important piece of legislation just enacted in Alabama, which appears to have led in the effective handling of this vexing problem. The agitation in Alabama, centering in Birmingham, has been kept up for a number of weeks, one of the prime motors being the Citizens' Alliance, which has proved potent wherever it has been organized. Birmingham has had experience in some of the worst phases of the boycott and the general reign of terror relied upon by unions in carrying on strikes, the long molders' strike there being attended with violence, coercion and other lawlessness. President Hardie, of the Hardie-Tynes Co., as president of the Citizens' Alliance, has been active in the campaign for law and order and the right of free workmen to work.

The anti-boycott sentiment crystallized in the following bill, which became a law last week. It passed the lower house by a vote of 62 to 30 and the senate by 22 to 9, and has received the governor's signature. It will be noticed that the law also covers the lawlessness connected with the picketing of industrial plants and if properly enforced should guarantee employers in the right to operate their plants without asking the consent of striking employes. The full text is as follows:

"Section 1. Be it enacted by the Legislature of Alabama, That it shall be unlawful for two or more persons to conspire together for the purpose of preventing any person, persons, firm or corporation from carrying on any lawful business within the State of Alabama, or for the purpose of interfering with the same.

"Sec. 2. That it shall be unlawful for any person or persons to go near to or loiter about the premises or place of business of any person, firm or corporation engaged in a lawful business, for the purpose of influencing or inducing others not to trade with, buy from, sell to or have business dealings with such person, firm or corporation, or to picket the works or place of business of such person, firm or corporation, for the purpose of interfering with or injuring any lawful business or enterprise.

"Sec. 3. That it shall be unlawful to print or circulate any notice of boycott, boycott cards, stickers, dodgers or unfair lists, publishing or declaring that a boycott or ban exists or has existed or is contemplated against any person, firm or corporation doing a lawful business, or publishing the name of any judicial officer or other public official upon any blacklist, unfair list or other similar list because of any lawful act or decision of such official.

"Sec. 4. That it shall be unlawful to use force, threats or other means of intimidation to prevent any person from engaging in any lawful occupation at any place he or she sees fit.

"Sec. 5. That it shall be unlawful for any person, firm or corporation to maintain a blacklist or to notify any other firm or corporation that any person has been blacklisted by such person, firm or corporation, or to use any other similar means to prevent such persons from receiving employment. Any person, firm or corporation violating any provision of this act must, on conviction, pay a fine of not less than fifty ($50.00) dollars, nor more than five hundred ($500.00) dollars, or to be imprisoned not to exceed sixty days' hard labor for the county.

"That all laws and parts of laws in conflict with the provisions of this act be and the same are hereby repealed."

Alabama has taken a resolute step that may well become a pattern for legislation in other States.

DEMAND OF THE LAKE UNION GRANTED.

The trouble between the Masters' and Pilots' Association and the Pittsburg Steamship Co. was settled Sept. 25 by granting the demands of the union, as to the one non-union master, Capt. Rae. The agreement of the vessel owners and the union is as follows:

1. Capt. Frank Rae to be relieved from command of the steamer Clemson at once and she be manned with members of the Masters' and Pilots' Association. That in the event Capt. Frank Rae will file an application for membership in the Masters' and Pilots' Association within 15 days from date, the board of directors and the committee having in charge the negotiating of a settlement of this controversy pledge themselves to use their best efforts to have it favorably acted upon prior to the meeting of the Masters' and Pilots' and Lake Carriers' Association, to be held during the winter.

2. All members of the Masters' and Pilots' Association to return at once to the same positions they occupied on the vessels on which they were employed immediately prior to this controversy with no stoppage of pay during the time the vessels may have been stopped.

3. All vessels to be put into commission immediately and to make at least one round trip.

4. The discussion of all other grievances that may exist to date to be waived until the meeting arranged between the Masters' and Pilots' and Lake Carriers' Association to take place this winter.

The vessels tied up on account of the strike are now in commission.

TROUBLE IN THE HOUSESMITH'S UNION.

The sessions of the International Association of Structural Iron and Bridge Workers in Kansas City have been characterized by almost daily turmoil. The Parks union, of New York City, was admitted to membership on technical grounds in spite of its suspension by President Buchanan. A rump convention was in session for a day or two, and delegates representing a number of the largest cities threaten to withdraw from the organization if Parks continues to dominate its proceedings. An address issued by the anti-Parks delegates from New York was presented to the convention and referred to the grievance committee. The circular says:

"In refusing us a charter you have indorsed all that is bad and rotten in trades unionism. You have lost to your body the greatest city in the country. In three months there will be nothing left of No. 2 and the international in New York. Any organization that relies on brute force will end in disorder and disruption."

The circular attacks Sam Parks in particular, and says strikes were called "because the money was not coming in fast enough."

The action of the international convention at Kansas City in reinstating Sam Parks' Housesmiths and Bridgemen's Union, No. 2, is making trouble in New York. The American Bridge Co. has an agreement with the Parks union expiring April 30, 1904, by which only members of the union shall be employed. On the other hand, the Employers' Association, of New York, decided not to recognize directly or indirectly the Housesmiths and Bridgemen's Union, No. 2, of

New York. In the meantime, work has been suspended on these buildings for several months, and there is no immediate prospect of its starting up. An officer of the American Bridge Co. states that as the Parks union is now officially recognized by its international body, and as it has not violated its agreement with the company, the latter cannot employ any members of the new union.

EMPLOYERS ORGANIZE AT CHICAGO.

The organization of a national employers' association, whose members will be bound to the "open shop" principle and banded against the actions of labor unions, was effected in Chicago, Sept. 29. Representatives of thirteen organizations of employers met and pledged themselves to the movement to create a central organization which will be to the employers what the American Federation of Labor is to the unions. D. M. Parry, president of the National Manufacturers' Association, Secretary Frederick M. Job, of the Employers' Association of Chicago, and E. F. DuBrul, of the National Metal Trades Association, were among those present at the meeting. Employers' organizations in Cincinnati, Dayton, O., Kansas City, Denver, Akron, O., New York, Sedalia, Mo., and Marshalltown, Ia., were represented. In addition to declaring themselves against the exactions of the unions, those present at the meeting expressed opposition to the interference of the National Civic Federation in labor affairs. Plans formulated will be passed upon by a convention of employers which is to be held in Chicago early in November.

MORE TROUBLE IN PROSPECT ON THE LAKES.

Members of the marine engineers' union on the Great Lakes will resist the effort which will be made this winter by the masters of lake vessels to get control of the employment and discharge of the engineers. Vice President Jenkins, of the engineers' union, declares that the engineers will never go back to the old plan of making terms with the masters. The masters insist that, in order to have full control of the vessels, they must have authority to employ and discharge engineers. They claim that labor contracts are being made almost entirely between the various classes of labor and vessel owners direct and that this has begotten such an independence of the captain that he has little authority on his vessel and discipline and efficiency are not what they were.

LABOR NOTES.

The Stark Rolling Mill Co., Canton, O., resumed operations this week, but not under the sheet scale of the Amalgamated Association. The management claims that fully 75 percent of its employes have returned to work and it is probable that the entire former force will be back at work shortly. The company claims that it cannot operate profitably under the present limit of output as fixed by the Amalgamated Association.

The executive council of the American Federation of Labor has pigeonholed the resolutions adopted by the Central Labor Union, of Washington, denouncing President Roosevelt for his action in the Miller case, and it is not expected that the resolutions will again see the light of day. This action is a decisive victory for the conservative members of the council, especially John Mitchell.

Boiler makers in the shops of the Big Four railroad in various cities in Indiana and Ohio have gone on a strike. They have been working for 30 cents an hour and ask an increase of 5 cents.

A few days ago the molders of the Lane & Bodley foundry, of Cincinnati, sent a petition to the company asking for an increase of wages from $3 to $3.20 per day. This was granted, and everything was working smoothly until the company hired five or six non-union molders. The union molders, their helpers and ten coremakers then went on a strike.

Another general shutdown of all building operations in New York City is threatened, involving more than 100,000 employes, owing to the refusal of the journeymen stonecutters to either sign the arbitration plan of the Building Trades Employers' Association or to work with members of new unions formed under the auspices of that association.

Fifty boiler makers employed at the plant of the Girard Boiler & Manufacturing Co., Girard, O., have gone on a strike on account of the employment of a colored man who had been sent out on an erecting job in charge of a crew.

An increase in wages to 8,000 employes of the twenty car and locomotive repair shops of the Chicago & Northwestern Railroad has been granted. The increase means an additional expense of $300,000 a year to the company. More than a month ago a grievance committee representing the unions of employes in shops located at the various division points of the road presented demands for a wage increase of 3 cents an hour, the recognition of the union and the adjustment of working conditions in the shops. Conferences with the master mechanic and the managing officials of the company resulted in the signing of an agreement which grants recognition of the union, provides for a union steward in each shop and gives the men an increase in wages varying from 1 to 2½ cents an hour.

The strike of the twenty-three steamfitters of the Cleveland Steam Fitting & Supply Co., Cleveland, has been settled, and the men have returned to work.

The Central Railroad has granted an increase of 5 percent to the machinists working in the shops of Macon, Ga., and the strike has been declared off. The machinists asked for a 10 percent increase.

Restriction in the Connellsville Coke Region.

(Special Telegram.)

PITTSBURG, Sept. 30.—Reports from Connellsville place the number of ovens in the Upper and Lower regions that have been put out this week at 2,000. The output of 18 plants of the H. C. Frick Coke Co. was greatly curtailed about a week ago, and in the present week a number were shut down entirely. The Rainey and other large interests in the region are also putting out their ovens and there will be a still further reduction of output as soon as the pig iron curtailment proposition becomes effective. While many of the furnaces in the Central West represented at the operators' meeting in this city yesterday use West Virginia coke, the bulk of the product comes from the Connellsville region. It is safe to say that if production at these furnaces is cut down one-third in the next three months the ovens in the Connellsville region will be compelled to put out ovens from time to time, representing a total curtailment in October, November and December equal to about two weeks' full time.

An Ornament to Any Shop.

An advertiser in a Cleveland paper seeks a position and outlines his fitness as follows: "Machinist engineer, well experienced in all kinds of machine work, energetic, highly industrious, resplendent with potent inventive thought of mind and capable to invent or improve on any subject desired, would accept a position with some responsible firm with a chance to work himself up."

Sauveur & Whiting, 446 Tremont St., Boston, whose quarterly the *Metallographist* has been so valuable an adjunct to those following the study of iron and steel by the aid of the microscope, announce a new publication which is to start Jan. 1. It will be known as the *Iron and Steel Metallurgist* and with it will be incorporated the *Metallographist*. The publication will be a monthly and its purpose is to do for iron metallurgists, engineers and chemists what the *Metallographist* has done for those following the study of metallography. The contributors will include eminent metallurgists and engineers of this country and Europe. There will be in each number a review of the world's literature in iron and steel.

One of the stacks of the Dover furnace, of the Cumberland River Estates, Ltd., Bear Spring, Tenn., was partly destroyed on Sept. 3, but the reports of the damage were much exaggerated. The company says that the expense will probably be met by $2,500 and the furnace will be promptly repaired.

LAKE SUPERIOR IRON MINES.

Amos Shepard, superintendent of mines for the Cleveland firm of Corrigan, McKinney & Co., estimates that the ore shipments from the lake region this season will be about 25,000,000 tons.

The Supreme Court of Michigan has handed down a decision sustaining the Circuit Court in the case of the Negaunee Iron Co. against the Cleveland-Cliffs Iron Co. Three years ago the latter company, claiming to be the successor of the Pioneer Iron Co., entered on the lands of the Negaunee Iron Co., at Negaunee, and began to explore for ore, alleging that this procedure was justified by an old lease given by the Negaunee Iron Co. An injunction was obtained and that decision is now affirmed.

The United States Steel Corporation has secured a lease of the Gibson mine at Champion, Mich. The mine has been closed since 1887.

A general reduction of forces of the iron mines in the vicinity of Ironwood, Mich., has gone into effect. About 500 men are laid off.

The management of the Hiawatha mine in Iron River, Mich., has closed a contract with the Kinnickinnic Furnace Co., at Bay View, Mich., as a result of which all rail shipments of ore will be made from mine to furnace until next April. The contract calls for the delivery of 200 tons daily.

Rogers, Brown & Co. interests are putting down a shaft on the property of the new Baraboo, Wis., district, which they have under option, preliminary exploration having shown a fine body of ore.

The full length of the ore body to be uncovered at the Fayal mine will be 2,600 feet. The ore body is estimated to be 600 feet wide, 200 feet thick and to contain 14,000,000 tons.

Officials of the Jones & Laughlin Steel Co. a few days ago visited the mines of the company on the Mesabi range opened in the past two years and surprised the superintendent, Thomas Walters, by making him a present of $50,000 as evidence of appreciation of his valuable services.

The Commodore mine of Corrigan, McKinney & Co. is to be stripped. The new Killorin-Philbin Co. will transform the property from an underground proposition to an open pit. The Commodore forty is one of the desirable mines on the Mesabi. The depth of the overburden is between 60 and 70 feet. It is said that the Commodore contains about 8,000,000 tons of ore. The ore on top of the deposit is lean, but lower down it is of high grade.

The Davis mine, formerly operated by the Wisconsin Manganese Ore Co., is advertised to be sold by the United States marshal at Ironwood, Mich., Nov. 2.

Section 21 mine of the Lake Superior Iron Co., on the Marquette range, is to close down Thursday, orders to that effect having been received from Duluth, and 250 men will be out. This is a non-Bessemer mine, the ore running 61 percent iron and quite high in phosphorus.

It is evidently the intention of the U. S. Steel Corporation, of which the Lake Superior Iron Co. is a part, to close down or materially curtail its non-Bessemer mines on all ranges outside the Mesabi. The officers of the company assert that too much of that class of ore has been produced and the constituent steel making companies are unable to take more of it this year. So the 21 mine is down, the Soudan mine at Vermillion range is to be down Thursday of this week, section 16 mine at Ishpeming is to be reduced to half force at once, and some Menominee properties are to be curtailed. This is the chief portion of the close of mines of which dispatches from minor points in the lake region have had much to say the past few days. From these ill-informed statements it might be presumed that the majority of miners were to be let out. At Soudan, 21 and 16, 850 men are to go out.

Most of the men to be discharged from non-Bessemer mines are to be taken on at other points, and an increase of production is to take place at once at a number of old-range mines. On the Mesabi the production of the fall and the development work of the winter will be unchanged from estimates, and will be very large. It is actually a fact that more men are to be employed in stripping and other development work the coming winter than in any corresponding period in the history of the Mesabi range, and the indications are that the product of 1904 from Minnesota will be in excess of any previous year.

All Vermillion mines outside the Soudon non-Bessemer will run heavily and steadily all fall and winter.

Geobic mines have had a slight reduction of force, amounting to about 15 percent of the entire number of men employed. Shipments from this range have been light this year and at many mines portions of the stockpiles of last winter are still on hand.

At Ishpeming, Mich., the Cleveland-Cliffs Iron Co. has instructed the management to lay off the night shifts at all four of the company's mines. Some 600 men will be affected.

Last week every steam-shovel mine on the Mesabi range belonging to the U. S. Steel Corporation group was closed down, and every shovel was laid off. This was due simply to the vessel strike, for the company could not afford to fill its docks with ore that might not be taken out this fall and would freeze in the docks for the winter. As soon as the strike was settled orders were sent to start all shovels, and the full volume of ore is now coming down. Most mines will be through by Nov. 1.

Mahoning mine at Hibbing is well up with its schedule and will have about 1,100,000 tons out by the end of October. Biwabik mine at Biwabik was to have produced 1,100,000 tons this year, but its schedules have been changed and no more than 750,000 tons are expected now. The mine belongs to an independent company and will close early.

For a small stripping job on the Eastern Mesabi contractors asked 48 cents and more per yard. The operators have decided to do their own stripping and are working with men and teams. They will put a shovel on after navigation closes, providing they do not find that, on account of frost, it is better to strip by hand during the cold weather than to use a single shovel. By hand the men would probably have an unfrozen face to work against all the time, but with a shovel it would take so long to make a through cut that by the time a second was started the frost would be in full depth.

Operators at the Great Western, Crystal Falls, had a sudden inflow of 3,000 gallons a minute to care for last week. The back of the first level caved and permitted a great rush of water. The mine will soon be working again.

Tobin mine at Crystal Falls has cleaned up its stocked ore, has increased its room for ore on surface and is to mine more the coming winter than ever. This new mine is proving to be a good one, and should make a large product. The shaft is to be sunk another level, and the system of mining is to be changed from underhand to back stopping.

Jos. Sellwood, of Duluth, who owns the old Rolling Mill mine, now Chester, near Negaunee, Mich., is starting important explorations there. The mine contains a large tonnage of lean silicious Bessemer ore, running about 40 percent iron, .030 phosphorus and up to 38 percent silica. For certain purposes and under some conditions this is a very desirable ore, at the standard unit price.

Pumping capacity for 5,000 gallons a minute is to be installed at the Shenango mine, Mesabi range, which is probably to prove the wettest mine ever opened on that range. The mine lies under a large and deep swamp and this swamp is underlaid by a large bed of very "quick" sand.

The Railroads and Car Orders.

The halt in the placing of car orders by a number of railroads is referred to by W. K. Bixby, chairman of the board of directors of the American Car & Foundry Co. He considers this is largely due to the high rates for money. He says that there are some large orders for cars that will be placed by the railroads just as soon as satisfactory arrangements can be made to finance them. After the demand for money to move the crops is over, Chairman Bixby thinks there will be an easing up in the rates for money, and the railroads will then resume purchasing equipment on a liberal scale.

The Cleveland City Forge & Iron Co., Cleveland, has organized the Cleveland Car Specialty Co., which will manufacture spring planks, brake beams and, ultimately, trucks.

The Eastern Machinery Market.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., NEW YORK, Sept. 29.

Varying reports are given concerning the machinery trade in this vicinity for September. There are some who say that it was productive of more orders than the two months previous, while others assert the situation was unchanged, which is only another way of saying that business was dull. In the majority of cases, however, it would seem that an improvement took place, but it was only slight at the best. More was heard during the month of delay in the closing of contracts than for some time past, while in not a few instances some prospective orders were permanently shelved. Buyers seem to be holding off for a variety of causes, chiefly because of financial and labor disturbances, and the belief that lower prices for machinery must accrue if things do not soon get better.

In machine tools, the month showed some improvement. The orders were made up exclusively of small lots. Large propositions that have been hanging fire for some time were expected to materialize, but did not do so. This was especially true of railroad specifications, which are kept from the trade. While talk is heard of railroads pursuing a policy of retrenchment, no definite evidence of it, so far as machinery is concerned, has come to light. Machine tool men who take care of this kind of trade all say that plans made by railroads some time ago, involving the purchase of machine tools, will be carried out, although they have no definite assurances as to when the specifications will reach them. Inquiries for machine tools showed a gratifying increase during the month, but the remark is general that they do not culminate in orders as readily as formerly. The impression is that the inquiries are simply "feelers," and made to ascertain whether prices show a reactionary tendency.

The prices of machine tools, with the possible exception of what one manufacturer calls "the more salable milling machines," in which advances of about 5 percent took place recently, are a little easier. There are some who in their anxiety to get orders don't hesitate to shade their prices a little. It will be remembered that on July 15, last, lathe attachments were raised 5 percent, yet there is reliable authority for the statement that at least two lathe manufacturers have taken orders at prices that were in vogue before the increase was made.

In engines and boilers, as well as in electrical machinery, the adverse conditions seem to be most distinctly felt. In engines, the orders never get above 300 h. p., and in the main only average 100 h. p. Manufacturers on all sides tell of projects calling for engines being either temporarily or permanently abandoned. Many shops are fast disposing of orders on their books, and unless business picks up soon, a large number of men will be laid off. Some shops have already reduced their working forces. At the works of McIntosh, Seymour & Co., at Auburn, N. Y., about 125 men were discharged recently. Deliveries are getting much easier, and an order for a 300-h. p. engine could be filled in 60 days, which is about the best delivery noted in several years. In boilers, business was quiet, with orders all running to small units.

Electrical machinery manufacturers found September productive of only a fair business, some saying orders were more plentiful than in August, while others found the contrary. All of them are earnestly seeking orders for small equipment, in which there has been a notable falling off recently. Prices for this class of machinery are decidedly irregular, and those named by a leading interest show as much as 25 percent reduction from those quoted by the same company two months ago. Proof of what we have stated is seen in the action of the General Electric Co., which recently laid off about 1,500 men—not 5,000 as reported—which was due to the marked falling off in its small trade during the past few months. Smaller manufacturers are gradually reducing their working forces for the same reason.

In power transmission machinery and machinists' supplies, a fair business has been done during the month. Prices are reported as being well maintained.

All machinery men interviewed take a hopeful view of the outlook, and think the closing months of the year will witness a good revival in trade. The general opinion is, however, that unless the financial skies clear, and labor shows a fairer spirit, the improvement cannot be of substantial proportions.

The export trade during the month was a little more brisk. It is evident that American manufacturers are more anxious to extend their business abroad than they have been in some time, and are rewarded with an occasional order.

The Loomis-Pettibone Gas Machinery Co., which purchased a large plot of land at Elizabeth, N. J., last April, with the intention of erecting a $600,000 plant, has decided not to build. An official of the company said that the decision was due to the unsettled condition of the labor and structural material markets. The company had gone so far with the proposed plant as to issue several months ago specifications calling for $150,000 worth of machine tools alone. As already announced, the company absorbed the plant of the Holthoff Machine Co., at Cudahy, Wis., and is now making additions which will double its capacity. Some $60,000 has recently been expended for equipping the plant, the orders going to Manning, Maxwell, & Moore, Hill, Clarke & Co., and the Fosdick Machine Tool Co., among others.

The Niles-Bement-Pond Co. reports a better business for September than in August, which was the poorest month this year. Miscellaneous trade was good, especially in cranes, a good sized order for the latter coming from the National Steel Foundry Co., New Haven, Conn. The company says that many orders for machine tools from railroads are being held back, but expects them to be forthcoming when the financial situation improves. It believes that the remaining months of the year will bring about a good increase in the volume of orders.

The Ingersoll-Sergeant Drill Co. says its business has improved considerably recently. As a result of municpal enterprises, the air compressor trade has taken a decided advance, orders for 31 having been received from St. Louis, and for 8 from the subway authorites in New York City, in the past month. The company is making considerable headway with its new plant at Phillippsburgh, N. J., and is gradually purchasing the equipment. The export business is increasing also.

F. B. DeGress, the New York manager of the Crocker-Wheeler Co., at 39 Cortlandt St., reports business as having improved greatly in the past month. Orders taken by him include the following: 13 motors, aggregating 300 h. p., and 40 motor-driven grinders, the Stromberg-Carlson Co., Rochester, N. Y.; 26 motors, aggregating 135 h. p., the International Lace Co., Gouverneur, N. Y.; one 60-k. w. generator, and five motors, aggregating 60 h. p., the Norwood Manufacturing Co., Bridgeport, N. Y.; one 50-k. w. generator, Grand Central Palace, New York City; complete electrical equipment, the Sheridan Iron Works, Champlain, N. Y.; one 250-k. w. engine type generator, and 8 motors aggregating 100 h. p., the National Steel Foundry Co., New Haven, Conn.; and one 60-k. w. engine type generator, John Toler's Sons, Newark, N. J. In order to take care of its increasing business in Central New York, the company has opened a branch office at 731 Onandaga County Savings Bank Building, Syracuse, N. Y. The company has had ready for installation for the past five months, motors aggregating 1,000 h. p. for the new building of the Metropolitan Life Insurance Co., at 23d St. and Madison Ave., this city; but "Sam" Parks and his cohorts stand in the way of the motors being erected.

An official of the New York Metal Trades Association said to your correspondent: "Machine shops in the East must have their order books considerably reinforced if they are to be run to their full capacity this winter. For example, I know of a machinery plant in the East which employs 800 men, and whose orders during the past two months have fallen off some 60 percent. This plant is now making stock. Many machine shops have been compelled to lay off some of their men recently, and night gangs are a thing of the past. There are some shops which are only working three days a week. Machinery men have lost an immense amount of orders during the past summer, in consequence of labor disturbances, resulting as they have in the stoppage of many building operations in New York and elsewhere."

Philadelphia Machinery Market.

PHILADELPHIA, Sept. 28.—September has proved to be a most disappointing month in machinery circles. August was a poor month in point of volume of trade, but the business for the month just closing has been much lighter. It was thought that a good fall business would surely start up after the first of the month, but there have been no signs of it. Orders have been very scarce; in fact, in some establishments none have been booked. Shipments have been fairly heavy, but in the piece not particularly notable, covering very largely standard requirements and ordinary equipment. In the face of this condition inquiries are numerous and growing in volume every day, and the amount of estimating going on everywhere is quite large. Several large transactions, which it was expected would be closed early in the month, appear to be hung up indefinitely, and buyers generally are in a waiting mood. That the present state of things is only temporary no one doubts, but there is a good deal of speculation as to whether the latter part of October will see the end of the lull.

The closing down of the rolling mills of the Pencoyd plant of the American Bridge Co. has given rise to all sorts of rumors regarding the future of that plant. Many see in this closing the preliminaries of abandonment of the whole plant, especially as with the closing of the department 16 draughtsmen and a chief were laid off. It may be that such a thing will come to pass but it will probably be some time before the step is taken. The large machine shop which is being built at the works is still under construction, and the expenditure on it is to an extent lavish; and the company has been in the market lately for a good deal of its equipment. This would look as though the building of bridges and construction work was to continue. Those who profess to know say that the rolling mill will shut down because the plant has never been able to produce at a cost less than $2 per ton over and above what the same material is being produced for at the Pittsburg plant, and was in consequence unprofitable. The general offices and engineering departments are to be removed to Pittsburg after the first of the year, but this fact has been known for some time, and does not bear upon the question of abandonment of the entire plant.

The Barr Pumping Engine Works went into the hands of a receiver last week. The plant has been fairly busy for some time, but it was never thought it was making any money.

The Wyndmoor Mfg. Co. is the name of a new concern which has secured ten acres of land at Wyndmoor, near this city, and is building a large steel structure which will be equipped for manufacturing special metals. It will shortly be in the market for its new equipment, which, it is reported, will include a rolling outfit for sheets.

Bids are being received for building the new shops of the Penna. Railroad at Fairview, Pa. About half a million dollars will be spent on the establishment of these shops. The plans include a machine shop 80x80 feet, a boiler and engine house 70x100 feet, two smith's shops, and a planing mill. It is not learned whether any specifications for equipment are out.

The Bureau of Supplies and Accounts is asking for bids for equipment for the New York Navy Yard. The equipment is mainly for the blacksmith shop. The bureau is also asking for bids to be opened Oct. 6 for machine tools, supplies, electric elevators, pumping machinery, etc., for the Navy Department at Washington, D. C.

The Harrison Safety Boiler Works has taken the building near its plant formerly occupied by the Tioga Steel & Forge Co., and has equipped it for an extension of its foundry. The concern is very busy on orders for boilers, feedwater heaters and separators, and reports business with it to be in a good condition.

The Delaware River Steel Casting Co., Chester, Pa., is in the market for the equipment for its new foundry. Among the orders already given is one to Alfred Box & Co. for the cranes.

The Belmont Iron Works, maker of ornamental and architectural iron work, which for many years has occupied quarters at 22d St. and Washington Ave., is about to erect a new plant at Chester, Pa., thirteen miles from its present site. It will require some additional equipment.

The Falkenau-Sinclair Co., builder of presses, machine tools and special machinery, reports that September was a good month for shipments. A 250-ton hydraulic press was shipped to parties in Western Pennsylvania; a double spindle milling machine for milling test specimens was shipped to the Penna. Railroad; a twelve-gang double action blanking and drawing press was shipped to the Crown Cork & Scale Co., Baltimore, Md.; nine power drives were sent to the Niagara Falls Power Co.; and a lot of testing machinery, presses and automatic feeds were shipped to different points.

The Wilbraham Green Blower Co., builder of pressure blowers and exhausters, has plenty of work in its shops and reports business as quite satisfactory with it.

The Philadelphia Pneumatic Tool Co. states that the volume of business for the month with it will exceed its August business. Among the orders booked during the month it mentions one from the Jenckes Machine Co., Sherbrooke, P. Q., for 12 pneumatic riveters and seven chipping tools; another from the Cambria Steel Co. for 15 drills; and several orders from different railroads. It also reports several orders from England, France, Denmark and Belgium.

The Keystone Machine Tool Co., builder of cold saws, boring machines and other tools, reports business as fair. Orders have in the main this month been for standard machines entirely.

The Hess Machine Works has booked more orders for file making machinery, all from foreign sources.

The Newton Machine Tool Works has had a pretty good month, and has made a great many shipments, mostly of ordinary machine tools. Among the larger shipments was one covering a large vertical milling machine to the Montreal Locomotive Works. The orders taken during the month include one from the British Westinghouse Co., Manchester, England, for a number of portable machines; and another from the Erie City Iron Works for a new machine for flanging off water legs.

The Eynon-Evans Mfg. Co., builder of engineering appliances, reports a good month's business. Its pattern shops and foundry are somewhat crowded with work and are likely to continue so for some time to come. A good many orders were secured during the month, but they covered small equipment only.

At the Baldwin Locomotive Works there is plenty of activity in evidence. There are contracts enough in hand to last nearly a year, and the capacity of the plant will be taxed to the utmost for some time to come. With its Burnham plant included, the concern is now furnishing employment for 17,000 men.

The export trade has picked up considerably, and inquiry is livelier. Machinery builders appear to be more disposed to invite foreign business and are making more effort to get it.

The Carborundum Co. is again making enlargements of its plant at Niagara Falls. After the invention of carborundum in 1891, the first commercial furnace of the company had a capacity of a quarter of a pound a day, and the first sale made was a little lot of twenty carats, sent out on an order from a jewelry house, at a price of 25 cents a carat, equal to $450 a pound. These small furnaces were replaced in two years by what seemed at that time to be enormous furnaces, requiring the use of 150 electrical horsepower. In 1896 the company built its plant at Niagara Falls, employing furnaces using 1,000 electrical horsepower. By 1900 the demand had more than caught up with the production and the capacity was doubled. Last year another 1,000 electrical horsepower was added, but the growth of the business has been so rapid that even with 3,000 electrical horsepower the company has, for months, been unable to fill its orders. A contract has now been made for 2,000 more electrical horsepower, and this will be turned into the works by December of this year, giving the plant a capacity of about ten million pounds of carborundum per annum. The company has secured an additional factory site of four acres, making in all over eight acres of ground now covered by the plant. On the new site is being erected a new mixing and furnace building, 146x134 feet. The new furnaces will be run by a current of 2,000 horsepower each, which is just double that used by the present furnaces.

EASTERN FURNACES WILL CURTAIL 20 PERCENT.

(Special Telegram.)

NEW YORK, Sept. 30.—Representatives of 40 blast furnaces in Eastern Pennsylvania and New Jersey, whose combined output is about 6,000 tons a day, met at the office of Rogers, Brown & Co. today. After a two hours' session, at which the report of the committee appointed last week was presented, it was decided to reduce output 20 percent in October. A longer period of curtailment was not agreed upon, because those present desired to see what the Southern and Central Western furnaces would do, and did not wish to take the risk of other sections unloading their pig iron upon the East. Each furnace will follow the method most convenient to it, in reducing production, as some interests have a number of furnaces. These, it was decided, could either blow out some stacks altogether or bank all for a few days at a time. No price or wage questions were discussed. Advices were received from the Central Western furnacemen's meeting at Pittsburg to the effect that they had agreed upon a plan to reduce output about one-third in the next three months.

PERSONAL.

W. C. Runyon, president of the Struthers Furnace Co., Struthers, O., has returned to New York after a five months' sojourn in Europe.

P. E. Montanus, president of the Springfield Machine Tool Co., Springfield, O., is the candidate for the legislature on the Democratic ticket in his county.

James Devlin, superintendent of the Bessemer coke plant of the H. C. Frick Coke Co., will leave for a trip to Ireland. He has been connected with the manufacture of Connellsville coke for 30 years. His associates gave him a purse and a cane.

C. I. Rader, formerly manager of the blast furnace department of the Republic Iron & Steel Co., and for the past two years connected with mining interests, suffered a stroke of paralysis while on a business trip to Cleveland recently.

Major Charles Gordon Falcon, Sir William Dick Cunyngham, Count Reginald Ward and Charles J. Huskinson, London, have arrived in the United States to inspect the plants of the National Steel & Wire Co., in which they are interested.

Robert F. Bahmann, secretary of the Blymer Iron Works, Cincinnati, Ohio, has returned home after an extensive visit to the Isthmus of Tehuantepec. The Cincinnati company has some substantial Mexican orders in hand.

Harmon H. Fulton, long the president of the Eclipse Machine Co., Elmira, N. Y., has tendered his resignation to the company, and will retire as soon as his withdrawal is accepted at the next meeting.

Henry H. Suplee, mechanical editor of the *Engineering Magazine*, has in press a mechanical engineer's reference book which will be issued by the J. B. Lippincott Co., of Philadelphia, in October. Mr. Suplee translated the monumental work of Reuleaux, the "Constructor," and is a member of prominent technical societies. The specimen pages indicate that the typography and illustration will be in keeping with high standards, and the combination of author and printer should therefore give excellent results.

Capt. A. M. Blakesley has disposed of his interest in the Rock Island Stove Co., Rock Island, Ill., to his partners, and has started for California, where he will spend the winter. Captain Blakesley retires from active business on account of the condition of his wife's health. He has been a resident of Rock Island 26 years, and during all that time has been identified with the Rock Island Stove Co. Most of the patterns turned out by the company have been of his design.

Sam T. Johnston, the well known Chicago representative of Obermayer & Co., has returned from his trip to Scotland, whither he went last summer to visit his old home.

James H. Slocum, private secretary to President W. E. Corey, of the United States Steel Corporation, whose home has been in Homestead, Pa., for more than 20 years, has removed to New York with his family.

Col. George D. Wick of Youngstown, O., has decided to return to the latter place for the winter. He spent the greater part of the summer abroad.

H. A. Jackson, resident manager of A. M. Crane & Co., Frick Building, Pittsburg, has accepted a position in the Pittsburg office of Naylor & Co., dealers in iron and steel, who also have offices in the Frick Building.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., Sept. 29.

Pig Tin.—The market during the week was very weak, and prices both here and in London at this writing are the lowest that have been reached in nearly a year. The same causes operated to depress prices in both markets, the most important being that new business has fallen off greatly, and tin plate mills are shutting down. The general opinion is that the outlook is more conducive to higher than lower prices. Closing prices today at the Metal Exchange were as follows: Spot, 25.45 to 25.60c; October, 24.50 to 24.80c. London closed today as follows: Spot, £112 7s 6d; futures, £113. Arrivals at Atlantic ports for the month to date aggregate 2,345 tons with 2,165 tons afloat.

Copper.—The market is in a more demoralized condition than it has been in some time. Not in months have buyers been so little in evidence as during the past week. Although the official prices were nominally reduced on Thursday, they are being shaded in the open market from ½ to ¾c, and even at this buyers cannot be drawn into the market. Reports are circulating that several large producers will reduce their forces shortly, and buyers are holding off in consequence. In London, the tone of the market has been weak, and prices have shown a daily decline. Closing prices today at the Metal Exchange are nominally as follows: Lake, 13¾c; Electrolytic, 13⅝c; Casting, 13⅛c. London's closings today follow: Spot, £54 7s 6d; futures, £54 10s. Exports for the month to date amount to 10,955 tons, against 10,742 tons for a corresponding period last year.

Lead.—The scarcity still prevails, and prices are unchanged at 4.50c, for spot. St. Louis still sells at 4.40c. London is slightly lower at £11.

Spelter.—Is firm at 6.00c. St. Louis is slightly weaker at 5.60c. London is lower at £20 15s.

Antimony.—Cookson's is 7¼c, Hallett's 6¼c, and outside brands 5¾c to 6c.

Quicksilver.—Is quoted at $47.00 per flask of 76½ pounds in lots of 100 flasks. London is £8 12s 6d.

Nickel.—Is selling at 40c to 47c for large lots down to a ton, and 50c and 60c for smaller quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, Sept. 29.

The developments in the stock market the past week and the closing down of a number of sheet and tin plate mills have weakened all metals and prices have fallen several points. Demand has been only of moderate proportions, buyers purchasing in small lots in anticipation of further reductions. We have revised our quotations, and quote Lake copper, carloads, 13⅛c to 13⅜c; casting, 13c to 13⅛c. Pig tin, carloads, 26¼c, lesser lots, 26¾c. Pig lead, 4.40c in 50 to 100-ton lots, and 4½c to 4¾c in small quantities. Spelter, 5.70c in carload lots, and 6c in small quantities; sheet zinc, 6¼c; antimony, 7½c to 8c, for both Cookson's and Hallett's.

Foote, Burt & Co., of Cleveland, report that they are getting a good number of inquiries and a fair amount of scattering orders. These are coming from every branch of manufacturing. The firm says: "The larger inquiries which have been on hand for a month or so are waiting, and we believe that business will be fair to good during fall and winter. We must not lose sight of the fact that we may be enjoying fair to good business which by contrast with that which we had in the fore part of last year would look dull at first glance. There is plenty of business but it must be sought for. It is not coming into the office door as it did in the first three months of the year. Prices remain for machine tools about what they have been and must remain so until labor and material go lower than they at present show signs of."

PRACTICAL POINTS ON THE PREMIUM SYSTEM.

The following extract is taken from a recent letter to *The Iron Trade Review* from a machine tool builder:

"In your issue of Sept. 3, 1903, page 79, our attention was called to an article by R. J. Sutton, 'Experience with the Premium and Piece Work Systems.' In part of the article, we note the case in point, the time of doing this piece of work was reduced from 800 to 125 hours. The writer failed to state, however, whether this work was accomplished by the same machines in 125 hours which took 800 hours by day work.

"It stands to reason that if there were installed from one thousand to five thousand dollars' worth, per man, of machinery of the latest improved type, the time could be reduced from 800 to 125 hours, but it seems unreasonable to believe that any well-organized works would be able to reduce so much time in the production of work with the same tools.

"We think many of the readers of your valued paper would be much interested to know the inside of this story."

Mr. Sutton's Comment.

The author of the article in question submits the following communication in reply:

"The particular job referred to consists of 100 pieces. The average time to complete, for a period of six months previous to the inauguration of the premium system, was eight hours each, although the average time taken before that was about 12 hours each. The average time at the present is about 1¼ hours each, though several of our machinists complete it in considerably less than this.

"As I was making a direct comparison between day-work and piece-work time, I would, of course, have mentioned the details if there had been any change in the design of the piece, or if improved manufacturing facilities had been installed. All of the work was, however, performed on a standard 18-inch engine lathe. Our superintendent has been in the manufacturing business for twenty-five years, and has held positions of authority with several of the most prominent manufacturers of the country, and our several foremen are also men of wide experience, yet all believed eight hours was fair time for the completion of the job in question.

"I have come in contact in a business way with perhaps 300 foremen and many superintendents in the past nine years, during which I have been in the employ of three large companies, all of which, you know, have been very successful, and are, I think, pretty well organized. Yet I could show hundreds of machine and assembling operations on which the time has been reduced in proportion to the time on this particular piece, which only goes to show that foremen are not competent to estimate the average time that mechanics of ordinary ability should spend on a given job. In fact, very few of the many manufacturing concerns whose methods I am familiar with even keep comparative detail operation costs, and those who do, and frequently question operation costs, and complain to the foremen that the time is high, are usually met with this answer: 'No, you are mistaken; the time is all right as charged,' and the foreman will invariably convince the superintendent or manager that the costs are as low as possible. But foremen are seldom questioned regarding detailed costs, and when they are, it is usually not by the superintendent or manager, but by some clerk who is probably incompetent. Nevertheless, the foreman will usually convince those in authority that he is getting the best possible results in his department, otherwise, of course, he would not hold his position long.

"It must also be remembered that foremen are usually promoted from the ranks and are more or less in sympathy with those under them, and seldom question the time spent on detail operations. And when they do investigate, the workmen can always find some excuse, such as hard castings, trouble in chucking the job or something of the kind, which will let them out. Workmen quite generally know more about the particular operation they happen to be working on than their foreman, and there have a very decided advantage.

"Workmen cannot be successfully driven by speed bosses or foremen. They must have the incentive in dollars to inspire them to give their employer anything like maximum output. Piece-work will usually increase output over straight day-work, but it is next to impossible to inaugurate it at present on account of the vigorous stand taken against it by organized labor. The premium system has in several instances that I know of superseded piece-work, and increased the output from 100 to 300 percent. An English engineer after a visit to this country states in the *Times* of Dec. 3, 1901: 'I went closely into the working of the system in one of the largest and most successful engineering establishments in the world. In the actual week's wage sheets which I inspected there were over 1,000 men who had earned premiums. The premium varied from 25 to 100 percent over the wages.'

"I inaugurated the premium system in the shops of that company. The point that I desire to make, however, is that the company operated piece-work for a period of about ten years previous to the inauguration of the premium system, though many workmen are at present more than doubling their day's wages under the premium system. In order to do this they must complete three pieces in the same time formerly taken to complete one. Two-thirds of this time the company receives for 50 percent of workman's daily wage rate. The piece-work prices were also very frequently cut, and as the premium jobs were figured from piece-work time, they represent a very large increase in production. The company, of course, believed it was securing a maximum output under the piece-work system. A similar system, though not so liberal from the workman's standpoint as the premium system and very much more complicated, and not applicable to all classes of work, increased the total production of the large machinery department in the Bethlehem Steel Co.'s plant over 300 percent.

"If your correspondent believes he is securing the maximum output under the piece-work or day-work system, I think I could convince him differently; and if he also believes his foremen are competent to estimate the best possible time in which the average machinist can complete a given job, I will be pleased to send him a few drawings for his own satisfaction. The eight-hour job has been estimated, by a number of men who are in authority with large companies in different parts of the country. Not one of these estimates was below ours and some ran as high as twenty hours, and I feel certain that few concerns would question the cost of an article which sells for $15, and costs, actual labor and material, $3.10, which was the cost of this piece when it was being completed in eight hours. The premium system is undoubtedly right, but the conditions governing it are often radically wrong."

The World's Pig Iron Production.

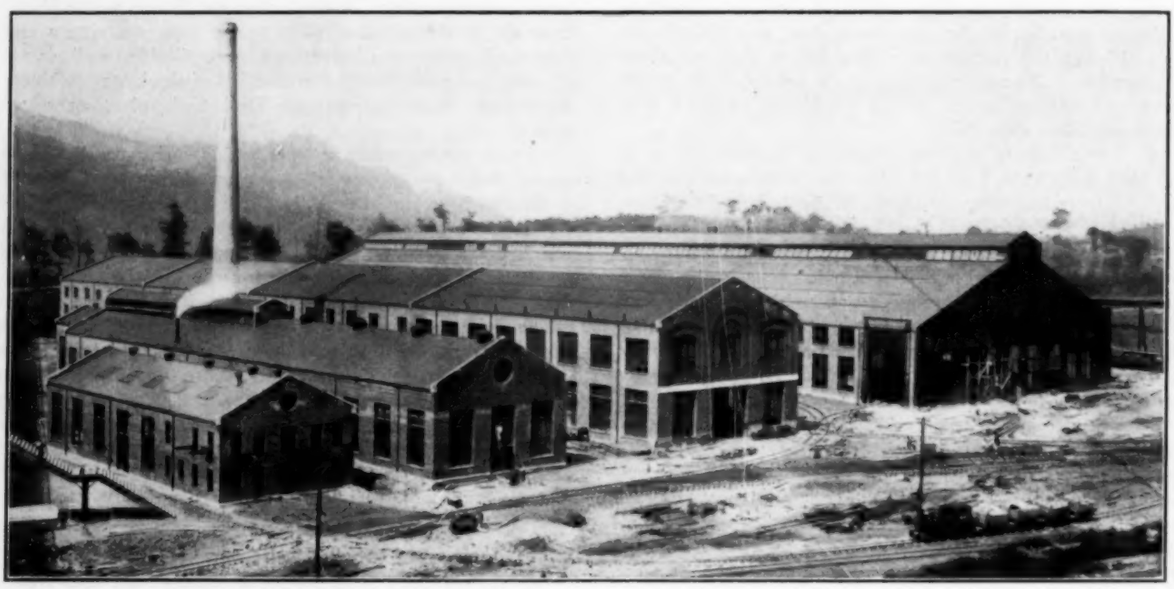
In the following comment on the world's pig iron output, from London *Engineering*, the figures are in metric tons:

"The United States has left us far behind in the production of pig iron, while Germany is pressing us hard. The aggregate production of pig throughout the world last year was estimated at 44,557,991 tons, as compared with 40,889,358 tons in 1901, showing an increase of 3,668,633 tons. The output of the United States last year was 18,003,448 tons, as compared with 16,132,408 tons in 1901, showing an increase of 1,871,040 tons. The fact is thus established that about 40 percent of the whole output of pig throughout the world is made in the United States. The output of pig in the United Kingdom last year was 8,653,976 tons, as compared with 7,977,459 tons in 1901; while that of Germany was 8,402,660 tons, as compared with 7,785,887 tons. The increase in the British production last year was, accordingly, 676,517 tons, while the German output expanded to the extent of 616,773 tons. The other principal producers of pig are the Austro-Hungarian empire, which made 1,335,000 tons in 1902, as compared with 1,300,000 tons in 1901; Belgium, which made 1,102,910 tons, as compared with 765,420 tons; France, which made 2,427,427 tons, as compared with 2,388,823 tons; and Russia, which made 2,566,000 tons, as compared with 2,807,972 tons. It will be seen that Russian production experienced a rather appreciable curtailment last year. The fact will not escape attention that the United States now produces more pig annually than both Great Britain and Germany combined."

The Waynesburg Sheet Iron & Tin Plate Co., Waynesburg, Pa., will place its two sheet mills in operation on Oct. 1.

The Plant of the Westinghouse Foundry Company at Trafford City, Pa.

At the old station known for many years as Stewart on the main line of the Pennsylvania Railroad, 17 miles east of Pittsburg, 4 miles from East Pittsburg and about 2½ miles from Wilmerding, Pa., has sprung into existence within two years a new industrial town which its projectors, the Westinghouse Companies, have called Trafford City, a name familiar to them from the fact that they were already in possession of large interests at Manchester, Eng., in a district known as Trafford Park. A complete account of the preliminary plans was published in *The Iron Trade Review* of Oct. 2, 1902, but the following description of the Westinghouse foundry at Trafford City has been brought up to date with the finished buildings, and we can now present a comprehensive survey of this immense undertaking. The initial step in the projection of this movement was taken early in 1902, when it became apparent that additional foundry facilities would, in the near future, become imperative, owing to the increasing business of the two great manufacturing enterprises at East Pittsburg, viz: the Westinghouse Electric & Mfg. Co. and the Westinghouse Machine Co. The product of the former consists of electric machinery and appurtenances, and the iron castings had been supplied from foundries located at Allegheny, Pa., and at Cleveland. The other company, producing steam and gas engines, and steam-turbines, operated a foundry at its own plant, and another in Pittsburg, South Side, which were of generous proportions, but changes in character as well as in the amount and sizes of products had already crowded their capacity. The phenomenal growth of the two enterprises had absorbed all the land in their vicinity available for manufacturing purposes, and the nearest procurable property which in every way met with the requirements of the case was located four miles distant at Stewart. Here 600 acres of land was secured by purchase for the Westinghouse Foundry Co.



PLANT OF THE WESTINGHOUSE FOUNDRY AT TRAFFORD CITY, PA.

The Locality.

The contour of the land, as everywhere in the neighborhood of Pittsburg, is hilly and rolling, with lateral streams draining the included watersheds and flowing into the Allegheny and Monongahela rivers. One of these smaller water courses, known locally as Turtle Creek, winds through the site of Trafford City, having in past ages, when it could boast of more majesty than it now possesses, worn down the land where it was softest and left it at this place with a slope composed of several terraced levels, and taking advantage of this natural arrangement, the Westinghouse Foundry Co. has established its plant on the lowest level on the same grade as the main tracks of the Pennsylvania Railroad, which pass adjacent to the site and connect with it, thus obtaining convenient facilities for the importation of raw materials without unnecessary handling.

On the several terraces, rising in front of the foundry, yet shielded from its too obtrusive appearance by the ample foliage of large and handsome trees, lies the town proper, enjoying every natural advantage that can be desired, both from a sanitary standpoint and from the picturesque beauty of its surroundings. This locality is sufficiently remote from the manufacturing environs of Pittsburg to escape the pall of smoke which envelops the latter, and on that account, if for no other, should be most inviting to the home seeker. The suburban train service of the Pennsylvania Railroad gives access to Stewart by a run of about 40 minutes from the Union Station in Pittsburg. The Pittsburg trolley system by an approach over a steel viaduct 1,000 feet long, especially constructed for the purpose, makes its terminal by a loop through the city streets. Another trolley line enters the city from Greensburg, 13 miles to the east.

The Foundry Site.

The site selected by the Westinghouse Foundry Co. for its plant is formed by a bend of Turtle Creek, in the shape of a reversed L and consists of about 130 acres in area of level bottom land. Here is sufficient room to provide for the present foundry buildings, including the iron foundry, the brass foundry, the pattern shop, pattern building, and power house, all of which are now completed, and afford room for the future construction of additional manufacturing plants equal to the combined capacity of all the plants now located in the Turtle Creek Valley.

Railroad Connections and Facilities for Handling Materials.

The site is connected with the main line of the Pennsylvania Railroad by the Turtle Creek Valley branch of the latter, thus providing a link with the outside world as an inlet for supplies. As an outlet for product, a single-track railroad of standard gauge and of the very heaviest type of construction has been built connecting the foundry site with East Pittsburg, at which point the castings will be delivered for machine finishing at the plants of the Westinghouse Companies. This road, built by the Westinghouse Companies and named the Westinghouse Interworks Railroad, intersects the town of Wilmerding situated about half way between Trafford City and East Pittsburg, where the great works of the West-

inghouse Air Brake Co. are located. The terminal of this road at Trafford City has been amplified by a system of tracks connecting with the Pennsylvania Railroad. This terminal system comprises a railroad yard for storage purposes, connected by suitable switches and turnouts with each building and equipped with a system of overhead cranes for handling the heavy and bulky materials used in the operation of the plant. A narrow gauge industrial railway, operated by ten-ton locomotives impelled by electric storage batteries, serves as an adjunct to the main system of railways in transporting about the yards and buildings the lighter and smaller supplies and accessories to the foundry service.

The Power House.

The power house, which includes under its roof a machine shop as well as a power plant, is 320 feet long by 56 feet wide. The building is of steel and brick construction, on concrete foundations, and with steel trussed roof covered with slate. The chimney is of Custodis construction, seven feet inside diameter and 175 feet high.

GENERAL VIEW OF FOUNDRY SHOWING CIRCULAR PIT FOR CORLISS ENGINES AND PORTION OF SQUARE MOLDING PIT WITH PERMANENT DRAGS FOR ENGINE BED PLATES.

This building contains an engine room in the center, with a boiler room at the rear, the repair machine shop connecting at the front. At the rear of the boiler room is a pump room containing the fire service pumps and those for serving the hydraulic hoists, both of which are connected with the city water main and with a reservoir in Turtle Creek, and back of this room is the locomotive room with provision for housing the two locomotives required for shifting purposes about the plant.

The Power Plant.

The boiler plant at present consists of two 5,000-h. p. Babcock & Wilcox boilers, ample space remaining for the accommodation of double this equipment when the future growth of the foundry plant will require it. These are supplied with Roney automatic stokers operated by standard Westinghouse engines, and fuel in the shape of coal slack coming from local mines at the terminal of Turtle Creek Railroad is furnished to them from steel hoppers overhead, to which it is carried by a "Link Belt" conveyor from a 100-ton storage pit outside of the building, into which the coal cars dump their contents while running over it.

The engine room is sufficiently large to accommodate two horizontal cross-compound Corliss steam engines of the Westinghouse type, having a capacity of 1,000 h. p. One of these only is at present required and is already installed and coupled direct to a 600-k. w., a. c., three-phase electric generator. A vertical gas engine of the Westinghouse type, having a capacity of 175 h. p., is also in place and is direct connected to a 120-k. w., a. c., d. c. generator. This engine draws its supply of gas from a well 1,900 feet deep, drilled on the property adjacent to the buildings.

The electric current from the steam driven plant is used during the day for operating the cranes and other power motors about the foundry, and for such arc and incandescent lighting of buildings as may be necessary during the day time. The current from the gas engine plant is used for such lighting and power as is required at night only. An underground tunnel six feet square, thoroughly water proofed, connects the power house with the other buildings, and in this are installed all electric light and power conduits and the piping for steam, air and water.

The Machine Shop.

This room is equipped with lathes, planers, drill presses, and pipe threading and cutting tools, and such other appliances as would be required in the maintenance of a plant of this character. They are operated by an electric motor.

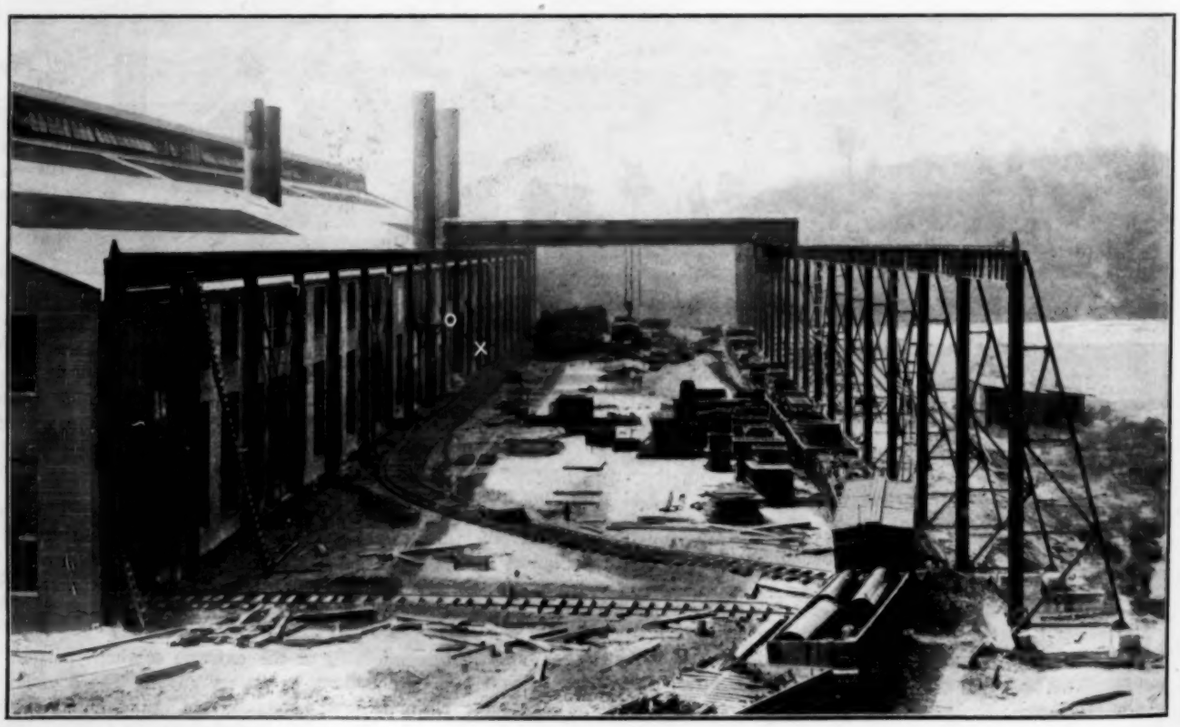
The Pattern Shop and Storage Building.

This building, located at the extreme southern portion of the site, is 605 feet long by 80 feet wide. The foundation is of concrete and the superstructure of brick and steel, with floors of slow-burning mill construction. The pattern shop occupies 160 feet of the north end and is two stories high. The floor of the second story is suspended from the roof

SIDE BAY OF FOUNDRY DEVOTED TO SMALL WORK, AIR FURNACES IN BACKGROUND.

trusses to free the first story from columns, thus providing ample space for handling large patterns which will be made there. Adequate facilities have been supplied for the kiln drying and storing of wood and for the handling of the latter and the manipulation of patterns. The building is equipped with hydraulic elevators of ample size. This shop is supplied with a most complete equipment of tools and appliances for wood working. The windows and skylights have been made large to admit plenty of light. Artificial illumination of the most approved character has been supplied, whereby the general lighting of the building is accomplished by arc lamps and the direct illumination of the tools and work is effected by means of Nernst lamps. In winter a mean temperature of between 50 and 60 degrees F. is preserved by means of a hot air system of heating, the air being forced by rotary fans through coils heated by either exhaust or live steam furnished from the power house. Ample lavatories and toilet conveniences are supplied on each floor, and in every way the comfort of the employes has been studied.

The remaining portion of this building, which is devoted to the storage of patterns, has three floors, the two upper ones being divided by interior fire walls into three separate compartments. The floors themselves are of 3-inch yellow pine covered by one thickness of maple flooring. The roof purlins are steel I-beams spaced 8 feet center to center and covered with 3-inch roof sheeting and slate. Automatic sprinklers are installed throughout this building, and the system of



STOCK YARD COMMANDED BY 50-TON ELECTRIC TRAVELING CRANE; O INDICATES PLATFORM LEADING TO CUPOLA CHARGING FLOOR, X THE CHARGING DOORS OF AIR FURNACES.

TRAVELING JIB CRANES.

hot air heating previously referred to keeps a mean temperature above 35 degrees F. in zero weather, to prevent freezing of the water in the pipes. Risers for hose connection are supplied for additional fire protection.

Ample elevator facilities have been provided for handling patterns, and a system of racks, each containing several tiers of shelving sub-divided into sections, has been installed on each floor for the storage of those of the smaller sizes. A system of marking and recording the patterns by the number of rack, tier and section to which they have been assigned secures their permanent location.

The Foundry Building.

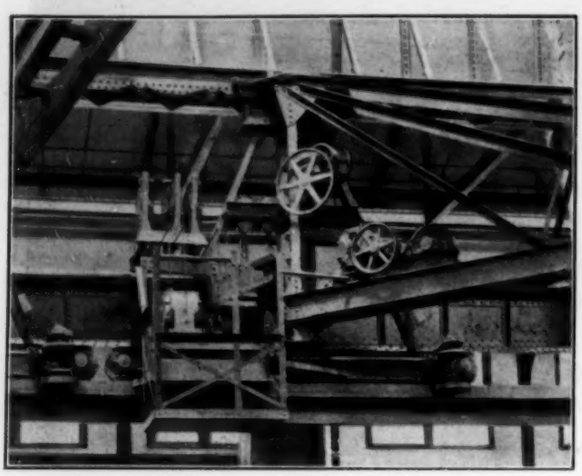
The first building for foundry purposes, which is now erected and in operation, adjoins the pattern shop, with a space of 100 feet between them. It is of brick and steel construction on concrete foundations, and is 612 feet long by 184 feet wide. The walls are 36 feet high at eaves and 80 feet at peak. It is divided transversely into three bays, the center bay being 80 feet wide and those on either side 50 feet 6 inches wide. These bays are traversed by traveling cranes, the center having one of one hundred tons and two of sixty tons capacity, all of the Sellers two-trolley type, and each of the side bays has three of the Morgan type of twenty tons capacity each. The center bay has in addition on either side special runways underneath those for the cranes just mentioned, and these accommodate four traveling jib cranes, two on each runway. These cranes reach out into the center bay about 35 feet, and as the largest molds will always be arranged close to the side posts they are thus intended to handle all the work of setting and drawing patterns, setting cores, and in fact are capable of doing all the work of the foundry except that of the very heaviest. A track from the main railroad system runs through each end of the building to cooperate with the larger cranes in the transportation of material to and from the foundry, and the narrow gauge railroad traverses the said bays from end to end and works conjointly with the smaller cranes.

ANOTHER VIEW OF THE TRAVELING JIB CRANES.

At the sides of the building is a space 100 feet wide which serves as a storage yard for flasks and heavy apparatus connected with the foundry operations. In the center of this yard also is stored the fuel and raw material for charging the melting furnaces. To serve the yard, runways are provided and equipped with a Sellers double trolley traveling crane of 50 tons capacity.

The Melting Department.

At the middle of the north bay is located an elevated charging platform to which the raw material is raised on



DRIVING MECHANISM OF TRAVELING JIB CRANE.

lifts operated by hydraulic power supplied from the power plant. The material can also be raised to this platform by means of the yard crane. All of the cupola charges will be made up and weighed in the yard while a coke bin has been provided on the charging floor with a capacity of 350 tons. The melting equipment consists of three cupola furnaces of 18 tons capacity per hour each and two air furnaces each of 30 tons capacity placed close by. The air furnaces are supplied from the yard by means of a charging apparatus. One of the furnaces has two taps so that the metal may be run simultaneously or as required into ladles in pits located both in front and on the side of the furnace. As it is not uncommon practice in foundry work to hold molten metal for three hours or more, it would easily be possible here to pour a casting of two hundred tons in weight, should such a requirement ever be made. By the use of the air furnace

GAS ENGINE SIDE OF POWER HOUSE.

method of melting iron, metal 50 percent stronger than that obtained from the cupola may be obtained, so that all large and important castings are usually made of the former metal. Across the building and opposite the melting plant are the core ovens. The two ovens are each divided into six compartments, one 18 feet by 18 feet and two 11 feet by 16 feet for the cores and one 10 feet by 8 feet and two 5 feet by 18 feet for the smaller cores. All of the compartments are equipped with Kinnear rolling doors. The core department is located in the space 120 feet by 60 feet between the two ovens. The ovens can be heated by coke or natural gas, as may be deemed expedient.

The Heating System.

Rotary blowers are placed on platforms under the roof and operated by two-speed motors. These blowers force air through coils heated by either live or exhaust steam from the power plant, and, by means of ducts, properly distribute heat throughout the building at a minimum temperature in zero weather of 50 degrees F.

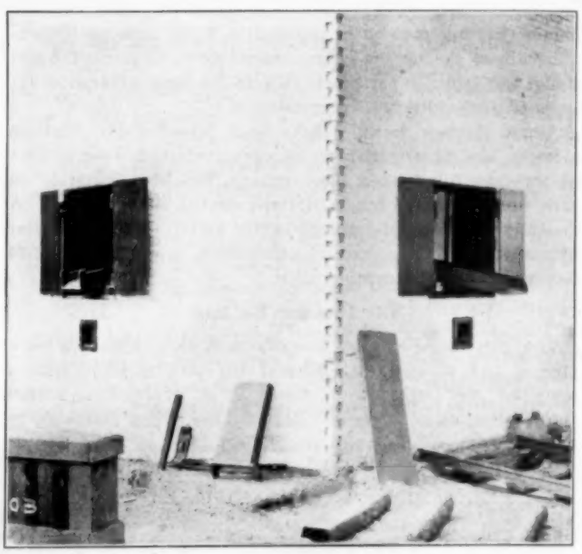
The automatic sprinkler system is installed and adjusted to operate at varying temperatures according to the nature of the work in different localities.

The Office and Brass Foundry Building.

Close to the viaduct and adjacent to the main approach to the foundry buildings is located a brick building of two stories in height in front, which part is occupied on the first floor by the business office of the Westinghouse Machine Co.'s foundry department, and the superintendent and his staff. The second floor is used as a drafting room. The rear of this building, from which the floor of the second story has been omitted, serves as the brass foundry. This room is 40 feet by 80 feet in size and contains six pit furnaces, together with the usual accessories of a modern brass foundry. This building can accommodate about twenty brass molders.

The Sand House.

This building is of wooden frame construction, 34 feet wide by 128 feet long, located adjacent to the foundry building.



ONE OF THE ENCLOSED CUPOLAS WITH TWO SPOUTS.

It is paralleled by a track of the main railroad system for receiving the sand, and a track of the narrow gauge railway leads into the building to receive the sand from the mixers for the foundry.

The Laboratory and Lavatory Building.

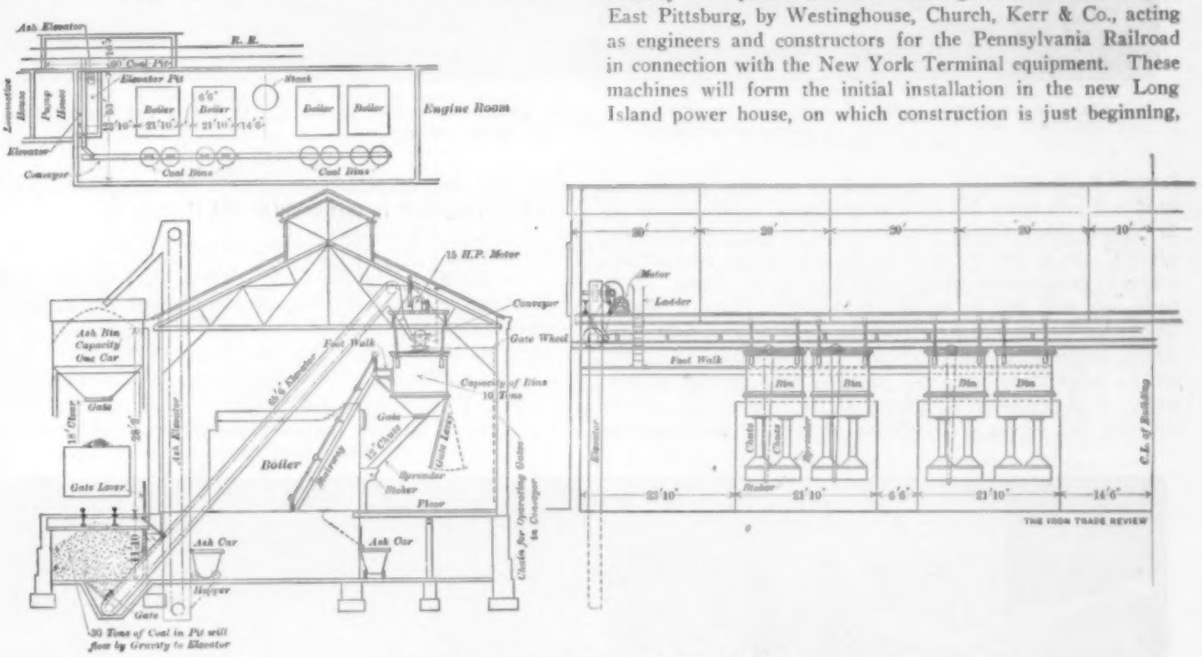
In the space between the pattern storage building and foundry is a two-story building 34 feet by 60 feet, of brick and steel construction. The rear of the upper floor of this building is equipped as a chemical laboratory, and the front part is devoted to offices for the foremen of the foundry. Intermediate between the front and rear are quarters for the janitor and a room for first aid to the injured. The lower floor is devoted to lavatories. It is equipped with the best modern outfit of wash-basins, shower baths, and closets, and is so arranged that each employe is supplied with an individual locker. By isolating this building for its specific purposes, the foundry buildings can be kept in the very best sanitary condition, and attendants insure the safe keeping of the clothing and property of the employes during their hours of service. The total number of men which this foundry is prepared to employ in normal times, in all the varied occupations incident to its operation, is about 600. In busy times,

however, as many as 1,000 men can be readily accommodated through the facilities for expansion that have been provided.

In the preparation of the design, construction and equipment of this foundry, which was carried out under the direction and supervision of the Westinghouse Machine Co., of East Pittsburg, a most complete study of the great foundries of the world was made and the best feature of all is here embodied, so that the arrangement as here shown represents the most approved characteristics of modern foundry practice.

The Industrial Town.

On the second grade of the slope, and 25 feet above the viaduct, stands Trafford Inn. This building is centrally located at a junction of two of the principal streets, and is designed to fufill not only the requirements of a first-class hostelry but, recognizing the desire of the members of the community for amusement, to supply also many of the features of a Casino. By according these dual functions to one building it becomes the central feature of the community and, having this opinion in mind, it has been very strongly and handsomely constructed of pressed brick with stone trimmings. It is of a size sufficient to accommodate 75 guests, the idea being to provide for the well-paid employes of the foundry who have no families, such comforts and accommodations as will render occupation at the Trafford plant most desirable. This scheme is really an experiment in sociology, the rates being such as are not expected to yield any profit.



BOILER HOUSE AND COAL HANDLING MACHINERY.

The rooms are arranged singly and in suites with convenient bath room and toilet equipment. The interior finish of the rooms is such that they can be made attractive with very little embellishment, and the lighting and heating facilities, furnished from the main power plant of the foundry, aid in making these accommodations comfortable. A large reading room on the first floor adjoins the dining room, and these two rooms, by being thrown together, can be used for meetings and entertainments. The basement is devoted to a billiard room, bowling alleys, etc.

On the same level is a row of eleven brick apartment buildings two stories high with flats to accommodate one family each.

On the next two upper levels, 75 and 100 feet above the lower level respectively, there have been erected with tasteful arrangement as to difference in type of architecture and finish, fifty houses of brick and stone construction. These houses vary in size from six to nine rooms each and afford comfortable and cosy homes for families of average size. Each of these houses occupies a lot with 30 feet frontage and an average depth of 100 feet, thus having ample space about it for light and air, and affording a small front yard with plenty of room in the rear. The rental and purchase prices of these houses and lots have been based on the cost of building in large numbers at one time without profit to the projectors, thus placing them within the range of the employes with the idea of inducing them to live adjacent to the plant.

The city site has been laid out into 2,000 building lots and space has been left for several parks, all of which are thickly wooded. The principal business streets and a portion of the residence streets are paved with brick with curbed flagstone sidewalks. The Philadelphia Co., of Pittsburg, has piped the town with natural gas available for illumination and heating purposes.

James Stewart & Co., of Pittsburg, who have constructed many of the buildings of the various Westinghouse Companies, have been the general contractors.

The projectors of the town site enterprise have placed their interests in the hands of the Real Estate Trust Co., of Pittsburg, and under their supervision restrictions have been placed on the sales of property, so that buyers are required to conform to definite regulations as to character and cost of buildings. No liquor of a spirituous nature can be sold within the city limits.

22,000 H. P. in Steam Turbines for Pennsylvania Railroad.

An order for three steam turbines of the largest size has recently been placed with the Westinghouse Machine Co., of East Pittsburg, by Westinghouse, Church, Kerr & Co., acting as engineers and constructors for the Pennsylvania Railroad in connection with the New York Terminal equipment. These machines will form the initial installation in the new Long Island power house, on which construction is just beginning, and which will serve the traction in the tunnels for the Hudson and East rivers and the New York Terminal at 32d Street and 7th Avenue, and also such part of the Long Island Railroad system as in in process of conversion to electric traction. The turbines will be of the Westinghouse horizontal short-barreled type mounted upon a single bedplate, resulting in a particularly compact arrangement and great economy of floor space; they will have a capacity of approximately 7,400 electrical horsepower each, and will drive 5,500-kilowatt, three-phase, alternating current generators operating in parallel. Their overload capacity will be over 11,000 horsepower and each turbine will be provided with a bypass automatically controlled by the governor to accommodate abnormal fluctuations in load. This will also permit operation at full load non-condensing. The turbine equipment will operate under conditions favorable to the attainment of high economy, viz.: 200 pounds steam pressure at the throttle, 28 inches vacuum and 125 degrees F. superheat. The generator will be direct connected to the turbine shaft through a flexible coupling, each section of the unit having two bearings of ample proportion. The three-phase winding will deliver current directly to the distribution system at 11,000 volts, no step-up trans-

AIR FURNACE WITH TWO TAPS. X INDICATES TAP USED IN RUNNING METAL INTO LADLE IN PIT X. O IS THE TAP FOR POURING METAL INTO LADLE IN PIT O BY MEANS OF RUNNER.

formers being employed. The machines will be separately excited and will carry full load continuously at 100 percent to 80 percent power factor, with a rise in temperature of 35 degrees C., or 50 percent overload for two hours with an increase in temperature rise of slightly over 50 percent. Each turbo-unit will thus be capable of delivering 8,250 k. w. for reasonable intervals and considerably in excess of this figure during momentary load fluctuations. The entire equipment will be delivered by July, 1904, one year from the date of contract. It is somewhat significant of the state of the turbine industry that eleven Westinghouse turbines of approximately the same size are under construction for heavy electric railway service, both in this country and abroad.

The Delphos Foundry Co., Delphos, O., recently organized with a capital of $50,000, has elected the following officers and directors: President, S. F. Shenk; vice president, H. L. Leilich; treasurer, Theodore Kemker; secretary, T. A. Weger. The directors are: S. F. Shenk, H. L. Leilich, T. A. Weger, Jos. Roth, A. B. King, T. J. Stallkamp, W. J. Steinle, Aaron Fisher, Theodore Kemker.

RACKS ON THIRD FLOOR OF PATTERN STORAGE BUILDING.

Compound Dies for Parts of Telephone Transmitter Cases.

BY JOSEPH V. WOODWORTH.

In Fig. 1 are shown the assembled parts of a telephone transmitter case of sheet metal, and in Figs. 2 to 6 the dies used for producing the parts. It is needless to state that these cases are used in great quantities and that the dies for their production are required to be of the most accurate and lasting construction in order that the parts may be produced rapidly and in exact duplication. As the work involved in the production of the transmitter case parts consists of blanking, drawing, forming, piercing and wiring, the dies are interesting and engravings of them together with the description of their construction and operation will prove suggestive in the adoption of similar tools for the production of a large variety of drawn sheet metal work, accurately and economically.

As will be seen from Fig. 1, the case consists of three parts, designated 1, 2 and 3, respectively. The part 1 is of an artistic snape and represents a nice job in drawn work. The die used for producing it is shown in Fig. 2, and was, as were all the blanking and drawing dies used in the production of the case parts, of the compound, double-action type of construction. As a great many toolmakers are not familiar with drawing dies of this type, a slight description of their use will contribute to an intelligent understanding of their making.

Double-action dies derive their name from the fact that they are used in double-action presses to cut a blank and at

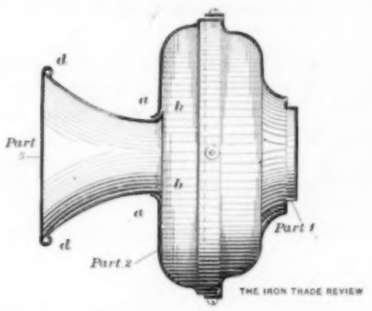


FIG. 1.—TRANSMITTER CASE ASSEMBLED.

the same stroke draw it into shape without the help of springs or buffers, as in the case with combination single-action dies. The kind and thickness of the metal used determine whether one or several operations will be necessary to obtain the desired shape and depth in the article. There are two essentially different types of double-action dies, viz., Fig. 2 is a "solid-bottom die," and Fig. 4 a "push-through die." However, they are both used in the same way.

Taking the die Fig. 2.—which was used for producing the part 1 of Fig. 1—G is the die bolster, in which the drawing and blanking dies are located. It will be understood that all parts of this die had to be constructed very accurately, that the working parts were hardened, drawn and ground and lapped smooth in order to produce the parts as required. In the die, A is the main drawing die, which is located in a taper seat in the bolster, while F F is the blanking die, located in a seat in the surface of the bolster and secured by means of the two fillister head screws H H. N is a stripper of the usual type.

In the punch section, L L is the combined cutting punch and blank holder; a forging of mild steel with a tool steel ring welded on to one side to act as the cutting punch I I. It was machined all over; being turned at J J to locate on the face of the outer ram of the double-action press, and was hardened and drawn at I I and then ground to fit the cutting die F F, after which the face was lapped so that the blank would be held evenly while being drawn. B is the drawing and forming punch and E its stem. The manner in which this die was used, as well as the other double-action dies shown here, will be understood from the following:

The lower or die section G is fastened to the face of the press bolster, while the combined cutting punch and blank holder I I is fastened to the face of the outer ram, and moves slightly in advance of the drawing punch B, the stem K of which is fastened in the inner ram, by which it is actuated. The outer ram of the double-action press being so arranged that, after making its stroke, it stops during about one-quarter revolution of the crank shaft, the combined cutting punch and blank-holder cuts the blank at F F, carries it down to the inner surface of the cutting die; holds it there tightly and remains stationary, holding it between the an-

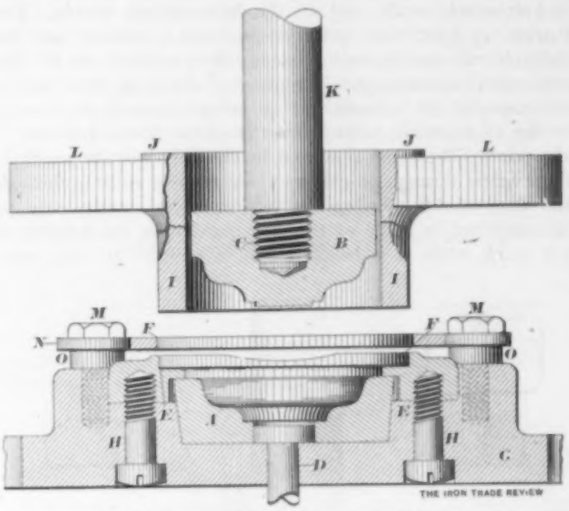


FIG. 2.—COMPOUND, DOUBLE ACTION DIE FOR BLANKING AND DRAWING PART 1 OF FIG. 1.

nular pressure surfaces of the punch and E E during the down dwell of the outer slide.

While the blank is under a pressure which has been regulated to suit the special requirements of the case, the drawing punch B continues its downward movement, thus drawing the metal from between the pressing surfaces into the shape required. As the punch rises the combined blank-holder and cutting punch remains stationary until the drawing punch has disappeared within it; then it rises also. At the completion of the up stroke a knockout attached to the press actuates the die knockout D which delivers the finished shell at the top of the die. Some very close work and careful grinding, lapping and polishing were necessary in order

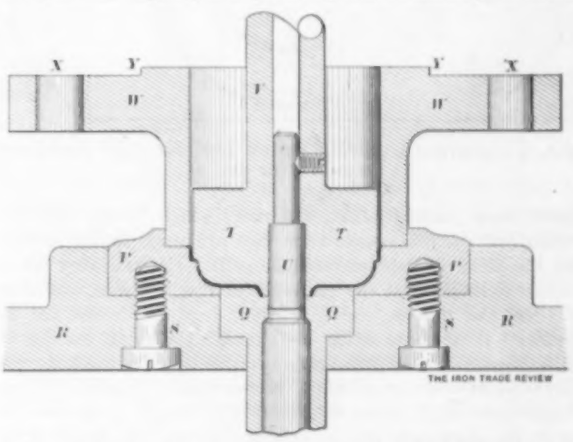


FIG. 3.—COMPOUND, DOUBLE ACTION DIE FOR PRODUCING PART 2 OF TRANSMITTER CASE, FIG. 1.

to get this die to produce part 1 as was desired, the metal used being sheet brass 1/16 inch thick, the utmost care being necessary to get the difference in the diameter and curves and shape of the punch and die exactly two thicknesses of metal.

The punch and die used for producing part 2 of Fig. 1 is shown in Fig. 3. Although a compound double-action die it will be seen that it is constructed differently from the one shown in Fig. 2, and that different results are accomplished in it. In this die the shell, forming part 2, of Fig. 1, is

blanked, drawn, formed, and a hole pierced in the center, to admit the end of part 3 as shown at a, Fig. 1, at one stroke of the press. However, the use and operation of the die are the same as explained for the first. As in the other, close and careful work were necessary on all the parts in order to have the die work well in the press. In the die section, R R is the cast-iron bolster, P P the combined cutting and drawing die, and Q Q the combined bottom-forming and hole-piercing die.

In the upper section of die, Fig. 3, W W is the combined cutting punch and blank holder; a forging, T T the drawing and forming punch, and U the hole-piercing punch. The manner is which the metal is cut, drawn, formed and the hole pierced, may be seen from the dark section. In this die the bottom-forming and hole-piercing die Q Q also acts in the capacity of a knockout; it being actuated on the up stroke of the press rams by the knockout device attached to the press. The blank produced by the hole-piercing punch U finds egress through an enlarged hole running entirely through the stem of the piercing die section. Ideal results may be accomplished in a die of this construction as the holding of the blank while it is being drawn is perfect; an even pressure being maintained all the time, which is *not* the case when single-action combination dies are used, as the tension on the blank is communicated through a rubber spring barrel which compresses as the blank-holder ring descends, and thus renders the tension uneven. Thus, deep draws can not be attained in a single-action die through the metal tearing or splitting because of too much pressure on the blank as the draw nears completion, while in compound, double-action or triple-action dies, draws of considerable depth, in comparison with the diameters, can be attained because the pressure on the metal is exerted by cams on the crank shaft and is, of course, even.

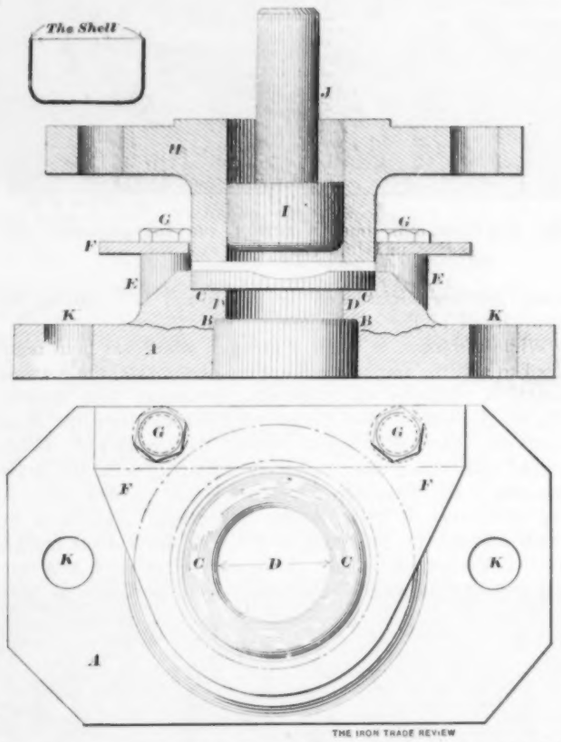


FIG. 4.—COMPOUND, DOUBLE ACTION DIE FOR FIRST OPERATION ON PART 3 OF FIG. 1.

To produce part 3 of the case, to the shape shown in Fig. 1, three operations were necessary. The first consisted of drawing a shell of the shape shown at the upper left of Fig. 4. This shell was blanked and drawn in the double-action "push-through" die shown in Fig. 4. As will be seen, the die section is in one piece. It was a forging of mild steel at base with a tool steel face for the cutting die. The weld of the two steels is indicated by a wavy line in the drawing. The machining and finishing of the die was accomplished in the usual manner; all working parts being left over size, and ground and lapped to a finish after the die had been hardened and tempered. A is the base, C C the cutting die and blank-holder portion, D D the drawing die and B B the stripping edge.

In the punch section, of Fig. 4, H is the combined cutting punch and blank-holder and I the drawing punch. As will be seen the die is equipped with a stripper of the usual construction. This die was a far more rapid producer than the other two, as the metal was cut, then drawn and pushed through the die, stripping at B B; thus obviating the necessity of a knockout and the delivering of the drawn shell at the top of the die.

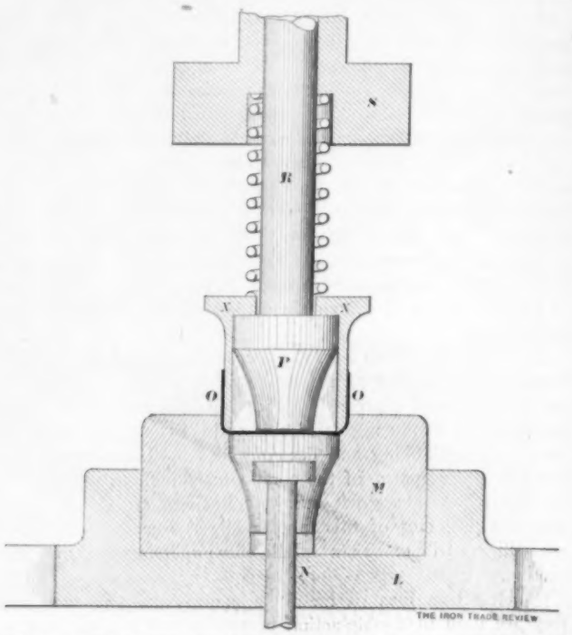


FIG. 5.—REDRAWING AND FORMING DIE FOR SECOND OPERATION IN PRODUCING PART 3 OF FIG. 1.

The second operation in the production of part 3 was accomplished by means of the tools shown in Fig. 5. These tools require little description as their construction and use are almost evident at a glance. S is the punch holder, P the drawing punch and R its stem; while X is the inside blank-holder which supports and holds the shell on the inside while it is being reduced and formed; Q is the stripper. In the die, L is the bolster, M the die and N the knockout for stripping the finished work from the die. The punch and die were operated in a reducing press with a stroke of considerable length.

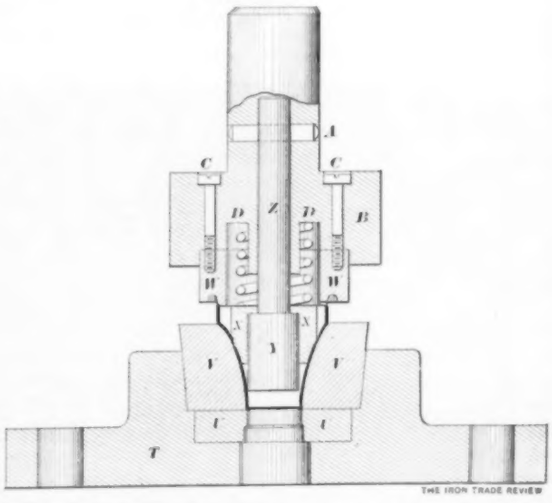


FIG. 6.—COMBINATION WIRING AND PIERCING DIE FOR LAST OPERATION ON PART 3, FIG. 1.

The last operation in the production of part 3 consisted of

punching out the bottom at b b, Fig. 1, and wiring the edge at d d as shown. This work was accomplished entire by the use of the combination, wiring and piercing die shown in Fig. 6. Although the drawing is very clear, a description may assist many to understand intelligently the construction and working of the tools.

In the lower section, T is a cast iron bolster, bored out and recessed for the hole-piercing die U U and the holder and locator V V. The piercing die was of tool steel, hardened, ground and lapped to size, and a force fit into its seat in the bolster, while V V was of mild steel worked out on the inside to fit the formed shells and turned taper on the outside to drive into the taper seat in the bolster.

The upper section consisted of, first, the holder, B, a forging of mild steel worked and machined as shown to contain the wiring die W W, the spring stripper and work supporter X X, and the piercing punch Y. As will be seen, the wiring die is located in a seat in the holder-face and fastened by means of fillister head screws, while the piercing punch is located in a reamed hole running entirely through the holder, and is permanently secured in position by means of a taper pin at A. The spring D D exerts enough pressure on the combined work supporter and stripper X X to allow of it supporting the shell on the inside, while it is being wired by the die W W, and then stripping it from the piercing punch at the rise of the press ram.

When the punch and die are in use, the shell is slipped into the locating seat in V V and the press stepped. As the punch descends, the supporter and stripper come in contact with the inside of the shell and hold it tightly, while the spring compresses and the rest of the punch parts continue to descend. Then the edge of the shell enters the wiring groove and follows around its curve; the punch descending until the curl is complete, the piercing punch, Y, having meanwhile punched the bottom out of the shell and into the die U. At the up stroke of the ram the stripper X X remains stationary until the piercing punch has left the shell and the wiring die has risen above it; then it rises also, leaving the finished shell in a position to be easily removed.

The other operations necessary to allow of the parts of the transmitter case being assembled as shown in Fig. 1, consisted of joining parts 3 and 2 together, as shown, and piercing four holes in the rims of parts 1 and 2 for screws. But as the tools used for those latter operations were very simple, their illustrating and describing are unnecessary.

In conclusion, I might state that it would be well for manufacturers of artistic drawn sheet metal articles and parts to give more attention to the use of double-action dies and double-action presses, as the results accomplished by their use are not to be compared with those accomplished by combination dies in single-action presses.

John Charlton, member of the Canadian Parliament, makes the statement that when he went to New York recently he met James Gayley, first vice president of the United States Steel Corporation, who told him that while the corporation had no immediate intention of establishing works in Canada, it was considering several locations, which might be decided upon at some time in the indefinite future. Mr. Gayley is said to look with special favor on Port Burwell, which is a new harbor within about 45 miles of Ashtabula, Conneaut and Fairport.

Charles H. Tidey, of Newark, N. J., and Francis C. Marshall, of Grand Rapids, have formed a co-partnership under the name of the Grand Rapids Machinery Co., and have equipped a plant where they will manufacture a saw set and a swinging saw gauge, both of which are inventions of Mr. Tidey, as well as a line of general woodworking machinery specialties.

SOME DEPARTMENT RECORD FORMS.

BY CHARLES B. COOK.

Knowing the interest taken by this paper in all matters pertaining to factory management, I herewith submit to its readers what we call a Department Record, Fig. 1. This form was adopted after several attempts to show our foremen what expenses they were directly responsible for and to let them realize they were watched pretty closely as to their executive ability in managing their departments and showing results, and it has been indirectly responsible for many changes for the good of the service. This form shows the foreman what his wants realized have cost his department in the carpenter's line, plumber's, millwright's, etc. In fact it records all expenses for which he is responsible. This record has been a great feature in our factory and the good results have warranted its continuation. Decreases of the different expenses have been continually noted and the foremen have shown themselves wide awake in their effort to reduce expenses consistent with the demand of increased production and good workmanship. When a change is wanted in their department involving the employment of the carpenters or millwrights, etc., the questions raised are, what will the expense be? and will the work result in a decrease of cost consistent with the investment? Previous to using this form it was customary for the foremen to ask and very often receive whatever they required or thought they required, but it is now very apparent that executive ability is displayed in their wants.

Month of JUL--1903

DEPARTMENT REPORT.

Dept. No. 36 A Mension, Assembling

NOTE: This Report is calculated to be used mainly as an aid to the Foreman, that he may satisfy himself that the increase or decrease of indirect expense in running his department is of a legitimate nature.

STUDY CAREFULLY.

Work done by Carpenters,	20	20
" " " Plumbers,	6	70
" " " Millwrights,	19	29
" " " Tool Room, (Repairs)	120	06
" " " Porters, Cleaning, Etc.,	53	71
Supplies as per Invoices, and signed by you,	160	34
" drawn by Requisitions from Stock,	436	76
Defective Work as per Inspection Department,	96	60
LABOR:		
Production, as per Factory Orders,	1230	21
Construction, " " "	69	70
Maintenance, " " "	171	06
Indirect, " " "	1609	13
TOTAL	1506	76

JUN--1903 .23 %
JUL--1903 .22 %
~~Increase~~. Decrease .01 % May - July Lowest .22 %

THE IRON TRADE REVIEW

FIG. 1.—DEPARTMENT REPORT.

Tools that were repeatedly changed and repaired to con-

Porters cleaning the different departments know that their time is reported on this record to the foreman whose department they clean and sweep, etc., and to retain the good will of the foreman means good and quick work in the department and their retention in the employment of the company.

Millwrights fixing machinery and belting know their work is being charged against the department, and any loafing, bad workmanship or carelessness is bound to tell against them, due to the watchfulness of the foreman guarding the interests of his department.

form with any suggestion the foreman might make, and which repairs seemed warranted, are now made to last, due to the foreman giving his best efforts to planning before making, thereby producing tools showing in their construction thought and good workmanship, not requiring constant repairing. This our record has shown to be the case and the decrease in tool repairs has been and is now gratifying to the management.

Defective work is also shown against the department. The work after being finished is then submitted to the Inspection

DEFECTIVE STOCK

Order No. 1609 Dept. No. 16 Date 8/12 1903

No. of Part 0-601 Quantity 27 Charge Dept. 16

OFFICE RECORD

Quantity 27 @ 6.20 $ 2.20

Ent. Cost Ledger 8/13/03 Stock Ledger 8/13/03

Charge D 16 Account Mfg to Exp.

THE IRON TRADE REVIEW

FIG. 2.—RECORD OF DEFECTIVE STOCK.

Department where all work done on any part or parts in each department is thoroughly inspected and after which the office is acquainted of the defective parts through the Form, Fig. 2, hereby submitted. The record is then priced and charged to the department causing the spoiled work and it naturally follows that work will be thoroughly looked after by the foreman while it is in process in his department, to reduce this account to a minimum.

Under the heading of "Labor" are the accounts as per Pay Roll for month in the department.

Production covers all labor charged to Manufacturing Orders.

Construction covers all additions to machinery and tools and buildings and fixtures.

Maintenance covers all repairs to machinery and tools and buildings and fixtures.

Indirect covers foreman's wages, petty work on production such as oiling of parts, hardening, etc.

Our company's policy is a very broad one toward the foremen. They are all picked men with ability especially fitted for the different classes of work engaged in, receive good

COST CARD.

NOTE: These slips are calculated to be used mainly as an aid to the Foremen, that they may satisfy themselves that any increase in cost is of a legitimate nature.

Foreman, Geo. Henke Dept. 21

Operation No. 1609 Part No. 0-641 Quantity: 16100

Part: Mainspring Lever

Operation: Finishg & Assg

Labor Previous Cost, $ 710

" Present " 694

Decrease, ~~Increase~~ 16 per 100

Remarks:

THE IRON TRADE REVIEW

FIG. 3.—COST CARD OF LABOR.

wages, have full authority, are managers of their departments and are treated with every consideration, all of their suggestions being acted on at once and every means taken to bring out the best in them.

Unison is a marked feature and due to the untiring energy displayed by the management. The Department Record is looked for every month and when certain charges are questioned, full explanations are given by the management, suggestions and counter-suggestions met with frankness begetting confidence that is shown in all dealings with them.

Comparisons of cost on all parts produced are also given to the foremen (See Figs. 3 and 4 showing cost of labor and material on jobs just finished against the cost of the same operation last done), and where there are over 7,000 distinct operations and about 800 parts on the machine produced, it will readily be seen the advantage obtained by a strict watch being kept on all operations. The foreman can see each month what jobs have increased or decreased under his jurisdiction and naturally an investigation of an increase of cost will probably reveal some slight oversight, or the quality has improved sufficiently to offset such increase; it is a great check against time being charged to wrong factory order numbers and it is a fact worth recording that errors of this kind have decreased considerably since this form was adopted.

Domestic Consumption of Pig Iron.

Rogers, Brown & Co., in a recent market review, comment as follows:

"The facts regarding consumption are watched with closest interest. Reports are as conflicting as those regarding crop damage. Judged, however, by the actual shipments of pig iron, the falling off in melt as compared with a year ago is very small. It is even a question if there is any diminution up to this time, taking the entire country together. A recent confidential report of foundries manufacturing an important line of cast-iron goods showed that about three-fourths were having a better trade now than one year ago.

COST CARD.

NOTE: These slips are calculated to be used mainly as an aid to the Foremen, that they may satisfy themselves that any increase in cost is of a legitimate nature.

Foreman, Geo. Hardy Dept., 11

Operation No. 3601 Part No. 0-27 Quantity: 8009

Part: Frame, Base Ends

Operation: Screw Machine

Material Previous Cost, $ 120

" Present " 119

Decrease, ~~Increase~~ 01 per 100

Remarks:

THE IRON TRADE REVIEW

FIG. 4.—COST CARD OF MATERIAL.

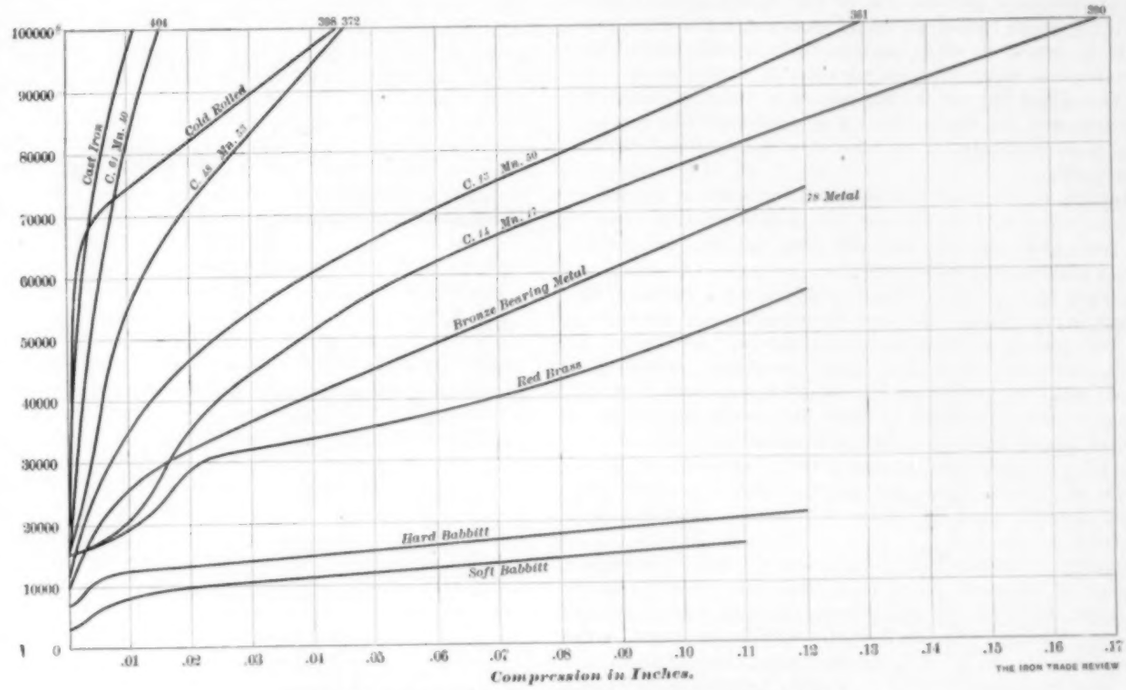
"If foreign importation of various kinds of iron and steel had stopped in the spring, as was expected, we would still be dealing with a scarcity in most lines. Producers of many forms of finished material are again turning their eyes toward foreign markets. This is altogether logical, and from this time on exports will be in increasing volume. There is a large foreign trade in iron and steel which has been killed by the excessive home demand of the past two years. It can be quickly revived again, however, if the home demand slackens. Fortunately, American steel and iron do not need to go through the process of introduction into the world's markets—it is simply a question of price. Those acquainted with international trade believe that in the next two years we will give back to the foreigners all the stuff they have sent us in the past two years."

On Oct. 1 the foundry of Headford & Hitchins, Dubuque, Ia., will be turned over to L. H. Pitts, former superintendent of the Union Electric Co., who will run the plant under the name of the Pitts Foundry & Contracting Co. Fire escapes will be built and a general jobbing foundry business will be done. The Headford & Hitchins Co. has been in business for many years and has been very successful. Messrs. Headford and Hitchins will remove to Waterloo, Ia., where they will start a similar concern. Mr. Pitts expects to enlarge the plant in the spring and put in additional machinery.

STEEL FORGINGS.*

BY T. D. LYNCH.

The constitution of materials of construction has become a science much broader and more complicated than most men realize. Metallurgy is a field in which all engineers are more or less interested and materials of construction are usually looked upon and discussed in technical meetings from the point of view of their use in bridges, buildings, rails, cars, boilers, etc., and known as structural material and boiler plates. It is true that great value is not improperly placed on this class of engineering material, yet there are other uses for materials that bear on different phases of physical and chemical combinations to meet given demands. No material, however, forms so great a part in our construction work, at the present time, as steel, and for the above named uses, specifications are quite complete and in the main very good. These have been standardized by the American Society for Testing Materials, and were summarized in 1902 by Mr. A. L. Colby as "American Standard Specifications for Steel." This publication does not cover all of the commercial problems we have to meet in steel; such a work is only intended to generalize, leaving special cases to be worked out by the individuals interested.



CURVES SHOWING COMPRESSION TESTS ON VARIOUS METALS.

In this brief paper it is intended to note some of the characteristics of steel forgings as they have presented themselves to the writer in commercial work. This includes special forgings as well as miscellaneous shafts of common, everyday production. Special heavy forgings in which a limit has been placed on carbon and manganese, in order to meet conditions of permeability, have brought new difficulties and some anxiety to the manufacturers of high grade steel.

It is a recognized fact that the best forgings obtainable are fluid compressed, hydraulic forged, oil tempered, and annealed nickel steel. The process of fluid compressing is estimated to condense the metal about 10 percent, forcing out the air and slag and closing up the grain. Forging under a heavy press allows the metal to flow and gives work to the central portion of the mass.

Oil tempering is claimed by some to be a cementation or carbonizing process, while others good in authority say it is only a tempering process and its special value is due to having the liquid at a proper temperature when the steel is immersed (to exclude the air), maintaining a uniform rate of quick cooling.

In the estimation of the writer, as the result of difficulties in obtaining forgings free from surface streaks and cracks, a forging where strength is important should never be allowed to cool rapidly and in no case should such a forging be cooled except in an annealing furnace or sand bath, and thus obtain very gradual cooling and eliminate shrinkage strains.

We realize that much depends on the annealing of steel; it may be so annealed as to govern the physical qualities to a certain extent. The ultimate and elastic limit points may be raised or lowered by proper heat treatment without setting up undue strains. The temperature to which the material is raised in the furnace, and its rate of slow cooling, accounts for the size and arrangement of the crystals, which in turn alter the physical qualities. Only the manufacturers of the steel can do this successfully, as it is necessary to know both the composition and previous treatment of the metal. The slightest deviation in the temperature and rate of cooling will render the steel unsuitable for high grade service.

It is very evident to those of us who have had occasion to take large castings from the sand, and even small ones for that matter, that if the sand is removed while the metal is still above the critical temperature, shrinking strains develop and irregular shaped castings are often broken asunder by these cooling strains, and physical tests give us unreliable results; while those properly cooled in the sand will render the material uniform in quality, easy to machine, and show good physical tests. If this is true of castings, why is it not equally true of forgings? Slow cooling appears to the writer to be the only means of securing uniform shrinkage. Too great care in this particular can not be given when the best results are desired.

Hollow forging has the advantage of giving more work to the center of a large body of metal. It does not seem to be good practice to hollow forge over a mandrel less than 8" in diameter, as the mandrel gets hot too quickly, while a mandrel 10" to 2" diameter is more desirable. When properly hollow forged, a large piece of steel is much improved by the extra work done upon it. Quite recently it has been my privilege to conduct extensive tests on hollow cylinder forgings made by Bethlehem, Midvale and Krupp, such forgings weighing from 4,000 pounds to 48,000 pounds. These cylinders were to be used under heavy strains, demanding the best material possible to get; some were nickel steel; some were carbon steel, and others were high silicon steel. The forgings in each case had to meet given physical and magnetic conditions.. A physical test was taken from near the periphery and near the bore of each forging.

In 90,000 pounds nickel steel the ultimate tensile strength

*Read before the Engineers' Society of Western Pennsylvania.

and elastic limit points were about 2 percent higher at the bore than at the periphery, while elongation and reduction showed in some cases as much as 16 percent more at the periphery than at the bore. Some individual cases, however, gave practically the same results at the different locations of the test pieces. The segregations in most of the forgings seemed almost insignificant. In carbon steel and silicon steel the physical tests were more uniform, being about the same from whatever position they were taken.

In many of these forgings white streaks were very prominent, and in a few cases cracks were found, necessitating rejections. I am advised that nearly all of the jackets for guns for the U. S. Ordnance show more or less of these white streaks, and while they are not considered dangerous, it is certainly desirable to eliminate them, for occasionally the difference in the appearance of white streaks and that of real cracks is so slight in a forging that the most careful scrutiny is necessary. In forgings for shafting I have traced cracks from surface to center, and sometimes extending for several feet along the shaft.

Another feature of forgings is that of hardness. This can be shown graphically by the accompanying chart. The ordinate gives the compression in inches, and the abscissa the pounds per square inch pressure applied. Shafts low in carbon or manganese, or both, may lead to mashed keyways, bent shafts, or fatigue breaks, while high carbon or high manganese, or both, render a shaft hard to machine and subject to crystallization under constant vibration or sudden shock.

I have found the material represented by curve 372 to be an excellent steel for shafts that are subjected to hard service. This is about the quality of material in use by the P. R. R. in car axles.

A study of the chart will give relative merit in the compression value cold rolled steel No. 398; high carbon steel No. 404; axle steel No. 372; soft steel No. 390; red brass, bronze bearings and babbitt metal.

A shaft high in carbon may be softened by annealing; but if high in manganese—say .70 or .80, annealing will not soften it. For general shafting of high grade and small sizes, a steel containing .40 to .50 carbon; manganese under .50; phosphorus and sulphur under .06, treated in such a manner as to give a minimum of 80,000 lbs. tensile strength, 40,000 lbs. elastic limit, 18 percent elongation in 2", and a test piece 1" x ½" bend 180° around a 1½" diameter, gives good results in service. Tests are usually taken at one-half the radial distance, either by hollow drilling or cutting from an extension of the shaft.

Forgings from high carbon steel must be carefully handled. A piece of this steel thrown on a damp floor or in a puddle of water while yet hot will temper the steel and render it hard to machine. In small shafts varying in length and diameter up to say 6", it is, in many cases, very desirable to cut them from rounds rolled to multiple length and machined to size. These may be tested by heats and a good uniform material assured at a minimum cost for testing.

German Competition Crowding British.

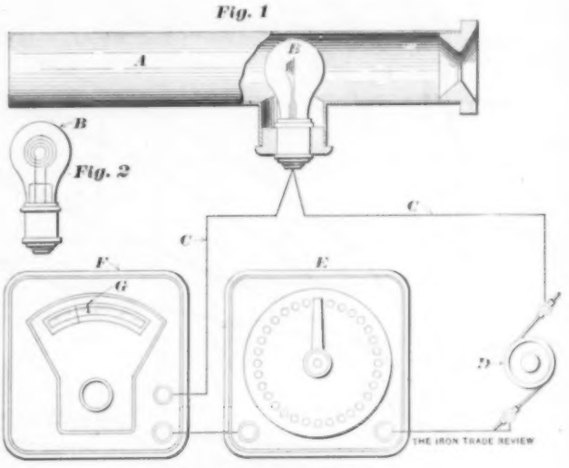
Joe Ellis, managing director of the Workington (Eng.) Iron Co., has issued a circular letter in which he declares that in the last 20 years 18 to 20 furnaces have been stopped in the West Cumberland district, causing a loss of wages (including one steel works laid off) of £5,000 to £6,000 per week, besides throwing more or less idle the collieries, iron ore mines, and limestone quarries that feed them. Mr. Ellis attributes this state of things to the German system of selling cheaper in England than at home, and selects rails as a case in point, the German selling these at, say, £6, while he can sell here at £4 10s to fill up his order book, whereby he can secure an average price, assuming one-half foreign orders, of £5 5s. per ton.

Mr. Ellis quotes the statement recently made by the Earl of Onslow, president of the board of agriculture, in which he declared that for the Transvaal railways lower prices were obtained from Germany than from any British firm—a fact which he attributed to the cheaper rates for transport, both by land and sea, made possible to the Germans by government control and subsidies. He asks what incentive there is to incur new expenditure for improvements under such conditions, and declares that "all the skill in the world cannot overcome unfair tariffs."

THE HEAT GAUGE IN TWIST DRILL WORK.

An article on pyrometry by color comparison appeared in *The Iron Trade Review* for Sept. 3 and dealt at some length with the patents of Messrs. Taylor and Gantt. The former is well known in connection with the development of the Taylor-White process of treating tool steel, and the methods discussed in the article in question are brought into service in the determination of the critical temperatures incidental to the most effective heats for high speed cutting steel. The patents utilized color screens, bottles filled with suitably colored liquid illuminated with electric light. The grading of the glow from the lamp by introducing resistance into the electric circuit was not overlooked and there are other points of similarity found in another system which will be described in the present article. Both the patents obtained by Messrs. Taylor and Gantt, as well as the two granted to Everett J. Morse, have passed into the possession of the one company, the Thermo-Gage Co., of Trumansburg, N. Y. The possibility of the one set of patents having any interference with the other is therefore no longer a matter of importance and is mentioned only to draw attention to the work by Messrs. Taylor and Gantt, described a month ago, and which is on quite parallel lines.

The plan proposed and patented by Everett F. Morse as a heat gauge for the higher temperatures employed in working metals, as in hardening tool steel, etc., is a simple and effective one. Most mechanics are familiar with the chromo-



THE MORSE HEAT GAUGE.

lithographs, or prints produced by other coloring processes, which, like the colors of the spectrum, are published as a guide or standard in the selection of the particular heat value the glowing metal should possess. Strips of paper mounted on cardboard to form a temperature scale—the dark blue at one end ranging through a series of gradations up to the lightest tinge of orange at the other—have served to indicate the purpose the steel would fill when "let down" to the appropriate stage and then quenched in the cooling medium. Good results have been obtained by tempering in this manner, the practiced eye of the observer following sharply the hues of the oxide forming on the surface of the steel with a nice appreciation of the delicacy of the operation.

Effective as this method has been in the hands of an expert in tempering, the shop systems of annealing and hardening have been less certain. That a piece of steel could be unwittingly overheated or "soaked" is a matter of shop experience acquired early but never too soon. The best temperature, however, is not so speedily known for hardening purposes, and pyrometers for shop forges and furnaces are not any too common. The hardening temperatures are in fact mentioned in such exasperatingly vague phrases as "a good cherry red," and so forth, the peculiar shade of red being recognized according to the special meaning applied by the individual workman. Probably in no other shop operation is the influence of the personal equation so manifest. Any attempt which aims at the removal of this uncertainty and is directed at placing the treatment of steel where temperatures

can be assigned and obtained in accordance with definite standards is therefore of very general interest to machine shop managers and proprietors.

The placing of a standard color scale where the substance heated may be compared side by side is well known in optical pyrometry. The apparatus is then so placed that the observer has to carry mentally from one to the other the color effect of either the standard or the heated substance. The accuracy of the test depends upon the eye of the observer, and even with the best skill, the effort exerted to make correct comparisons is fatiguing, so that time to rest the eye must be provided between the observations. When the operator, in addition to the mental effort of carrying the color sensations of the standard and the heated substance for comparison, has to make allowance for different impressions due to a variation in the size or shape of the glowing bodies of metal, then the reliability of the conclusions is greatly impaired.

These considerations suggest the standpoint from which the inventor developed his heat gauge—a device, by the way, which has received some attention from the Franklin Institute and has been proposed for the distinction of the John Scott legacy premium and medal. The proprietors of the Cleveland Twist Drill Co., Messrs. Cox and Prentiss, of Cleveland, are associated with the Thermo-Gage Co., of Trumansburg, N. Y., and the writer has recently had an opportunity of examining the work done with the help of the gauge in the Cleveland plant where the daily factory product runs up into the thousands. Few, if any, of the various items in modern machine shop equipment are made to more rigorous requirements than a twist drill. In size, straightness, shape of groove, backing off, angle of point and twist, evenness of temper and degree of hardness, any number of problems gather about the commercial drill. But we will not do more here than suggest the class of work to which the heat gauge has been applied and very successfully.

The germ of the invention lies curiously enough in exactly the same scheme which prompted the evolution of the Taylor-Gantt pyrometer. As described in *The Iron Trade Review* for Sept. 3, the inventors followed the fact that if two substances produce the same sensations in the eye and one of them is placed in the path of the rays passing from the other to the eye, the one so arranged seems to merge in the further substance. This is the case of the bicycle balls passing before the illuminated screen during the heat tests at the Simonds Rolling Mills at Fitchburg, Mass. The heated balls dropping before the bright screen were invisible at the desired temperature. When the temperature was too low, the falling ball appeared as a black streak across the screen, and when the temperature was too high a light streak came to view. The destinction served as an excellent test and reduced the percentage of bad work very materially.

The illustrations, Figs. 1 and 2, depict the essential elements in the Morse heat gauge. Fig. 1 represents the apparatus for carrying out the invention, and Fig. 2 is another view of the lamp. There is a tube A open at both ends, though either end could be closed by any transparent substance if desired. An incandescent lamp B is located in the tube and has a filament of either carbon or platinum and somewhat larger in cross-section than that of the ordinary incandescent lamp and this is included in an electric circuit C. The latter is supplied from a storage battery or some other source of current as at D. There is a rheostat E in the circuit and a meter or indicator, as at F, provided with the usual scale. A marker may be employed in the indicator, as represented at G. This marker may be set at a specified point where the index should stand when the apparatus is used for gauging the temperature of a certain class of work. A number of these markers can be employed when the apparatus is to be used on various batches of work requiring heating to different temperatures.

The apparatus at the factory of the Cleveland Twist Drill Co. is substantially identical with the device already described. It is employed for determining the temperature of the baths in which the drills are heated to the requisite temperature for hardening preliminary to the tempering process, the latter being accomplished by an oil bath. The tube with the enclosed lamp is attached to a swinging arm pivoted to the wall and capable of being brought conveniently before the workman and in line with the surface of the molten metal in the bath.

The coiled filament is large and is probably platinum, but has all the appearance of a steel spring with a "dark blue" finish. A storage battery is employed for the lamp as the delicacy of the apparatus has been found to be easily affected by the fluctuations of the regular lighting circuit, minute as they undoubtedly are in reality.

The degree of incandescence will vary with the current and this relation of temperature to electric current enables the filament to be raised to the proper glow by means of the rheostat and then the operator looks through the tube at the bath. The latter is raised or lowered in temperature until the heated convolutions of the lamp filament merge in the glow from the molten metal. A standard lamp is kept for comparison with the filaments in service so that when they waste away beyond the stage of usefulness they may be exchanged for new ones and the accuracy of the gauge maintained. The patent indicates a method of calibrating the lamps, but this need not now be discussed. So far as the regulation of the lamp and bath is concerned the adjustment is very close and there is a peculiarity about the filament which does not appear to have any mention in the patent specifications. This is the variation between the different portions of the filament. The middle convolution, or midway between the terminals set in the glass, is lighter in color than the ends and this slight but quite noticeable distinction permits the use of the two parts of the filament as a sort of limit gauge which assists in the rapid and exact adjustment of the bath.

For obvious reasons the temperature is not indicated by degrees in the shop. The scale is presented in the form of a table of symbols which have their values attached in readings for application to the electrical instruments. A difference of ten degrees is a very evident variation at the lamp and the device is quite a sensitive one.

It will be seen that while the device shows distinctly the temperature prescribed by those in charge and so far leaves nothing to the attendant but a careful compliance with written regulations for adjustment of the furnace gas valves and the electrical instruments, nothing has so far been suggested by way of a barrier to the drills being in the bath too long or too short a period. Near the bath and fastened to the wall is a short shaft in bearings. One end of the shaft has a belt pulley driven from the line shaft and the other end operates a pawl working on a ratchet wheel. The latter has about 250 teeth and at each revolution a lever strikes an adjacent bell. The pawl can be set to skip, say, ten teeth or less at a time and few or many strokes are therefore necessary to rotate the wheel and thus sound the bell. Two men handle a batch of work. An instruction card gives them the symbol indicating the temperature and a number tells how many teeth the pawl shall push at a time on the ratchet wheel. A greater or less number is requisite according to the small or large size of the lot of drills. The lamp is set, the bath at the required heat as indicated by the blending of the filament in the glow from the molten metal. The one workman has charged the tongs with his batch of drills and is on the point of immersing them in the bath. His associate shifts the belt on to the pulley and the pawl starts to move the ratchet wheel as the drills plunge into the bath. The pawl adjusted to time the wheel does its work and the bell rings in due course and the drills are removed for hardening. No dependence upon a system of guesswork, simply a method in which a pyrometer frees the office from the dominion of luck largely and introduces scientific control of the important elements in the heat treatment of metal.

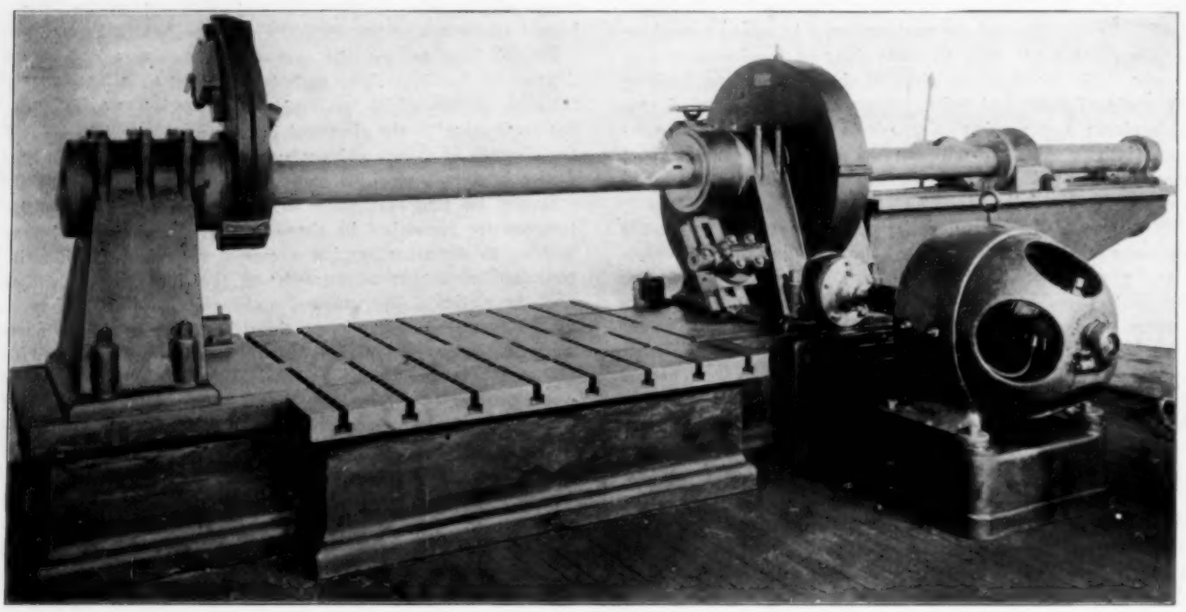
The Monarch Blast & Furnace Co., which has purchased the property of the Liberty Iron Co., at Liberty Furnace, Va., is overhauling the plant, preparatory to putting it in blast. The Liberty Furnace plant has a capacity of 15,500 tons of car wheel pig iron per year. It has been idle since 1893.

It is now expected that the new blast furnace of the Detroit Iron & Steel Co. at Zug Island will be finished in about two weeks. The plant has been held up by strikes and other troubles.

A MOTOR-DRIVEN HORIZONTAL BORING MACHINE.

When the individual motor drive for machine tools was first winning popularity, many adaptations of the system were made that in the light of present practice would be regarded as crude, to say the least. Later, with the benefit of experience and with more talent turned in that direction, the number of creditable designs embodying a motor drive increased. Among the simple and successful arrangements more recently produced is the one employed on the drive of the horizontal boring machine illustrated herewith.

The tool is a No. 3 Barret boring machine similar in all particulars to the belt-driven style, except that the cone pulley is replaced by a Crocker-Wheeler 13-h. p. motor mounted on a special cast iron base which is bolted to the bed of the machine proper. Overall the equipment occupies a floor space 18 feet 1½ inches long, exclusive of the projection of the boring bar, by 7 feet 4 inches. The boring bar is 6 inches in diameter, 16 feet 8 inches long, and is made of hammered steel. An Albro worm and worm-gear with a ratio of 70 to 1 transmits the power, affording a very smooth and even motion to the boring bar, particularly desirable in cylinder boring and work of a similar character. The worm and worm-gear are encased in one casting which protects the gears and confines the lubricant with the assistance of a stuffingbox surrounding the worm shaft.



A NEW MOTOR-DRIVEN BORING MACHINE.

The bearings in the pedestals supporting the boring bar have their centers 24 inches from the surface of the bed and are bored out 9 inches in diameter. Within these bearings are sleeves; one 23 inches long is contained in the tail pedestal and the other 30½ inches long forms the hub of the worm wheel. The sleeves are fixed against endwise displacement but are provided with feathers which engage the keyway extending the length of the splined boring bar so as to cause all to rotate simultaneously. On extensions of the sleeves between the pedestals are mounted arms which carry facing blocks. The latter support the facing tools and are arranged to feed axially or at right angles thereto, by the turning of star shaped hand-wheels. To make the feed automatic, tripping blocks may be fastened to the bed and set so as to revolve the screws one-fifth of a turn at each revolution of the boring bar.

For inside boring a cutting head, not shown in the illustration, is secured to the boring bar, the feeding being accomplished by sliding the whole bar endwise. The extended frame shown at the right of the machine with a third bearing at its outer extremity contributes to the ragidity of the bar and supports the feeding mechanism. This consists of a slidable carriage containing a sleeve that rotates with the boring bar and may be secured to it at any point, consequently any shifting of the carriage causes a lengthwise movement of the boring bar. A pinion on the carriage engages a rack on the frame, allowing direct hand feeding, and there is also a system for automatic feeding much the same as that commonly used on lathes. By this arrangement the bar can be handled very rapidly and, it is claimed, as easily as a carriage of any thirty-inch lathe. The machine has a continuous feed travel of 48 inches in either direction and will bore and face both sides of a cylinder at the same time.

With but the one speed reduction the machine is capable of twelve speeds in either direction varying from 2 2/7 to 15 3/7 revolutions per minute, secured by altering the speed of the motor. The latter is equipped with the Crocker-Wheeler system of multiple voltage current supply, whereby six fundamental speeds are obtained by distinct voltages increasing by increments of forty from zero to 240 volts, and six intermediate speeds secured through the use of a small resistance between each fundamental step.

The Barret boring machine is built by the Meadville Vise Co., Meadville, Pa., and the motor is the regular semi-enclosed type, size 10-I shunt motor, supplied by the Crocker-Wheeler Co., of Ampere, N. J.

A meeting of the creditors of the Southern Car & Foundry Co. was held at Chattanooga a few days ago. Claims amounting to about $1,000,000 were filed. The receivers stated that all of the plants are now in operation. The one at Anniston is working on a contract for 200 cars; the one at Lenoir City on a contract for 100 cars, and the one at Gadsden is repairing 500 cars. So many of the bills and accounts receivable have been attached, that there is a lack of operating funds. Something like $53,000 is due employes at the various works. The plant at Anniston was not complete when the bankruptcy occurred, but a lease of it has been effected for present purposes at $1,500 per month. Of the liabilities some $778,000 was secured by warehouse receipts, covering raw material. The receivers expect that their present operations will result in at least an advantageous sale of this material, if not an actual profit on the contract work. On motion of George D. Lancaster three trustees were elected, viz.: Thomas G. Bush, of Birmingham; Thomas A. Gillespie, of Orange, N. J.; and Orion L. Hurlbut, of Chattanooga. It was recommended that the former receivers might proceed to wind up the contracts now in existence. The bonds of the trustees were fixed at $100,000 each.

The Ætna Iron Co.'s property at Centerville, Tenn., has been sold by order of the court to the First National Bank of Nashville, for $15,000.

A RECORD IN COAL HOISTING.

The steadily increasing bulk in which coal is conveyed by sea and rail and stored for boiler service in high pockets at power stations and plants has led to a demand for increased speed in the necessary hoisting and handling machinery.

Demurrage on steamships and cars is an item to be carefully avoided in economical management and the large coal cargoes now shipped to terminals can only be handled with success by specially designed high speed machinery. The problem is different from and more difficult than the familiar one of bulk unloading and storage of coal, ore or similiar materials on the ground level from vessels. The element of height materially affects the machinery design. With a single tower hoisting to about fifty feet above tide water, forty to sixty tons an hour was till recently the common speed, and ninety to one hundred tons was only attained with difficulty in exceptionally favorable circumstances.

The work demanded of coal hoisting towers and their machinery is of the hardest description both from the unskilled nature of the labor employed and the shocks to the machinery incidental to the service, and it changes constantly with the nature and size of the coal, which may vary from a soft pea variety contained in open wooden barges to a hard foreign product in cubes two feet square loaded in steel vessels with small hatches. A great advance in the speed of handling coal from freight vessels and barges calls to be recorded, a world's record for rapid unloading having been recently established by the C. W. Hunt Co. West New Brighton, N. Y. at the Lincoln Wharf Power Station of the Boston Elevated Railway Co. We have already had some mention of a record-breaking performance in coal unloading and we can now present a more detailed account.

Run of mine bituminous coal was raised ninety feet above the tide water from one hatch of a vessel and delivered to the storage pockets, cracked to mechanical stoking size, at the rate of three hundred and twenty tons per hour by one tower. This is an advance of about two hundred percent upon the previous best, and marks an important mechanical engineering achievement.

To attain this end the steam engines of fifty to one hundred combined horsepower in common use have been replaced by machinery of three hundred horsepower, and the coal cracking machine attached to the tower cracks, to the proper dimensions, for automatic stokers before passing to the pockets, the enormous quantity of coal, over five tons per minute, delivered to it from the hoisting machinery. The ordinary small steam shovel has been supplanted by an automatic one of two tons capacity at each lift.

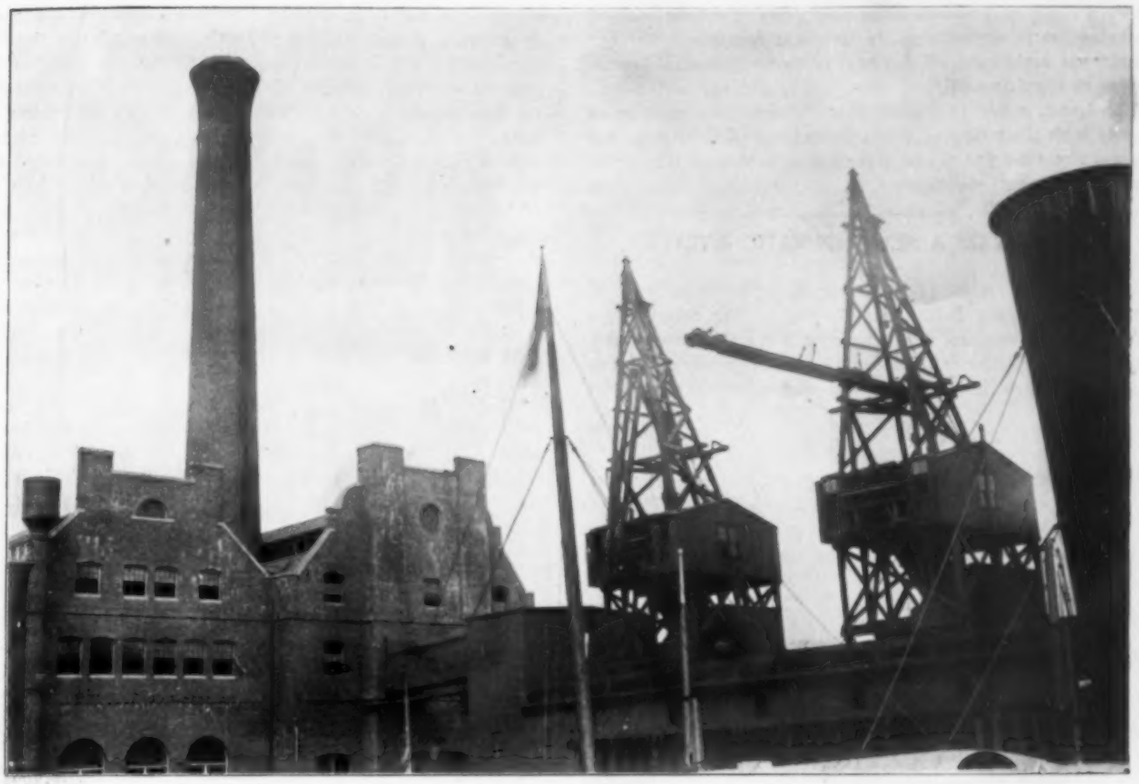


FIG. 1.—THE RECORD BREAKING COAL UNLOADER AT THE LINCOLN WHARF POWER STATION, AT BOSTON, MASS.

The time occupied in raising two tons of coal from the hold of a vessel to the discharging hopper nearly one hundred feet above is only six seconds, while the round trip, involving the operations of lowering and moving the shovel out on the boom, opening the former, digging up two tons of coal, raising it to the level of the hopper and discharging

FIG. 2.—THE C. W. HUNT CO.'S COAL UNLOADER AT BOSTON.

it therein, is frequently performed in twenty-two seconds.

The installation shown in the illustration follows in general design, but in heavier proportion, the standard Hunt steeple-tower rig, the moving gear and coal cracker being electrically driven and the hoisting engine direct connected. The towers have to traverse overhead the whole length of the coal storage pocket and to move thirty feet at a time without changing steam connection. In this way a single tower can operate on each hatch of a vessel in turn, or several towers can work simultaneously.

The boom, made to fold up for the free manipulation of vessels with their rigging, has an overhang of forty feet, and enables the tower to operate on coal steamers of the widest beam and largest dimensions.

FEATURES OF A NEW PNEUMATIC RIVETER.

A 55-inch riveter with a 12-inch cylinder, made by John F. Allen, of New York, is illustrated in Fig. 1. The design incorporates sundry features which have been the subject of recent patents. The piston rod connects levers of different lengths, forming a toggle joint. The lower ends of the larger levers

FIG. 1.—A 55-INCH ALLEN RIVETER WITH 12-INCH CYLINDER.

are attached to fixed centers on the frame, and the end of the short central lever is attached to the ram, which has a die head screwed into the lower end. By this latter arrangement any desired change in the distance between the dies can be easily effected.

The more recent improvements refer to the automatic cut-off arrangement which forces the valve back over the port opening and prevents the air from entering the cylinder when the machine is not in actual operation. This device is seen at D in Fig. 2. The port would be left open to the cylinder without this contrivance and the air would escape past the piston and out through the exhaust, resulting in a constant waste of air. As the design is arranged, the full air pressure is maintained in the valve chest and as the pressure is on the upper part of the valve the latter is kept down on the seat, preventing air passing through the cylinder ports and avoiding the necessity of shutting off air from the receiver in order to prevent waste. The spring movement when reversing the valve also prevents the sudden stop and consequent jar to the parts, a natural result when the valve is moved under pressure and then striking against the end of the valve chest. The economy effected in air consumption is claimed to be over 25 percent over the old attachment on this make of machines and many companies having tools purchased before its adoption have had the new device applied.

In Fig. 2 A indicates a small groove which runs from the port to the cylinder head and allows air to get behind the piston as the port is covered by the edge of the latter and ensures the piston starting promptly and gently on the forward stroke. B is a similar groove at the front end of the cylinder and has a similar effect on the piston when returning on the backward stroke. These grooves also retard the escape of air and create a cushion at each end of the cylinder and in this manner the motion of the piston is retarded and finally arrested. This improved construction takes the place of lugs on the frame at the point C, which on the earlier machines stopped the side link and arrested the movement of the piston at the end of its forward stroke. The sudden striking of the links against the lugs caused a jarring and severe strain on the working parts which the modern construction entirely avoids. The spring actuated push pin D forces back the valve promptly as soon as the opposing pressure is released.

The middle link is connected with the piston rod by means of a steel crosshead. The crosshead has a phosphor bronze shoe. The side links which fit over the trunnions on the middle link are connected by a straight pin. In this way a

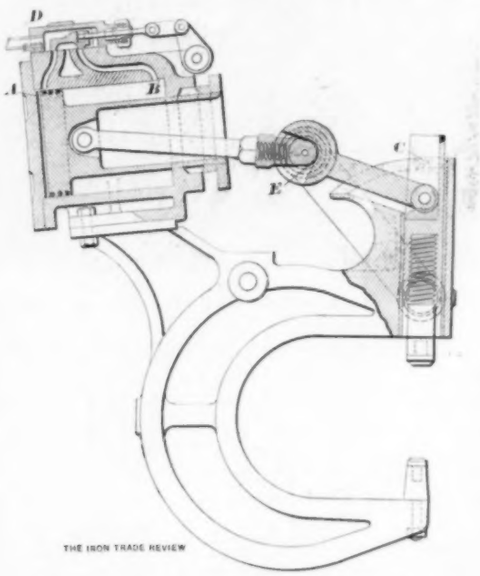


FIG. 2.—SECTIONAL VIEW OF ALLEN RIVETER.

double bearing is obtained and a direct leverage effected of a unique type in riveter design. Tests have determined that a 12-inch cylinder of this construction with 80 pounds pressure will exert 75 tons pressure on the head of the rivet and the tool is found very useful in the exacting service of mud ring work on locomotives, for instance.

The double joint is illustrated in Fig. 2 at E and the middle link and crosshead can be easily taken out by the simple operation of removing the nut on the end of the pin. Of course it is evident that the middle link has not only a double bearing by working on the center pin and the phosphor bronze shoe, but the lost motion can be readily taken up by the substitution of a new shoe or shimming up the old one.

A bill has been filed in Camden, N. J., before Vice Chancellor Grey by F. Schoenfield, a stockholder of the American Bridge Co., praying for an injunction to restrain the payment of the 2½-percent dividend, on the company's preferred stock. The bill charges fraud in the organization of the company and overcapitalization, claiming that the tangible assets are not worth more than $10,000,000, whereas the company is capitalized at $82,500,000; that while the company acquired 123 plants it has been operating only 30, and according to its last showing earned only 4 percent on $22,000,000. The vice chancellor denied the injunction.

A SYSTEM OF MULTIPLE MOLDING.

A. K. Beckwith, the general superintendent of the Beckwith Estate stove, furnace and range plant of Dowagiac, Mich., has invented and secured a patent on a molding machine and one that appears likely to occupy an important place in future foundry operations. Not only is it a great labor saver, but

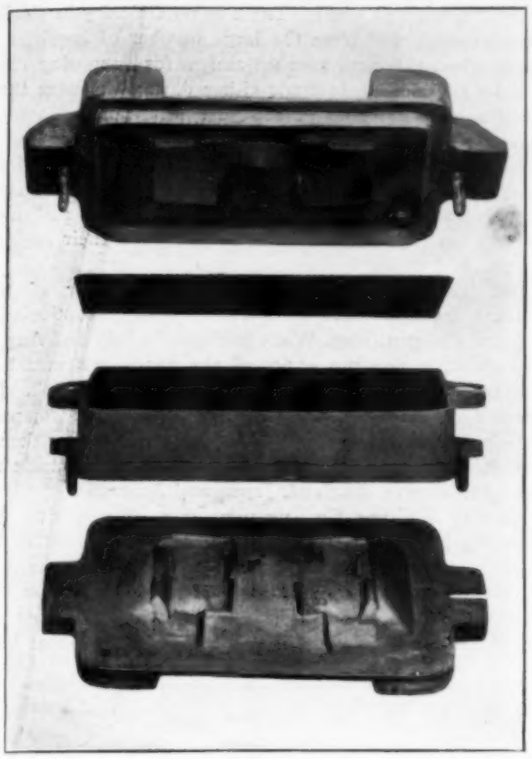


FIG. 1.—THE TOP AND BOTTOM PATTERNS, THE SHEET STEEL PLATE AND THE FLASK.

the floor space occupied by the finished molds is only about one-eighth that usually required. About one-half the usual amount of sand is used and one-half the flasks. The labor of pouring is much lessened, as a number of the molds are poured at once, and the labor of shaking out is equally reduced, as a number of the flasks are removed from the castings at one operation. Mr. Beckwith's appliance cannot properly be termed a molding machine, as his invention consists more properly of a combination of the flasks and suitable patterns. Any type of press can be used, either hand squeezers, or power machines. In practice at the Round Oak stove works, machines of the company's own design are used with compressed air for the motive power.

Of the ordinary match plates, on which half the pattern is on one side and the other half of the pattern on the reverse side of the plate, two are used. To the cope side of one of them a rim is attached at a distance far enough from the pattern to give good sand room, and high enough to be above all parts of the pattern. This plate is also provided with guide pins, which fit in holes in the other plate in the same manner as the guide pins of the cope and drag of an ordinary flask. The flask is made with guide pins on the bottom to fit the holes of the drag plate and with guide pin holes on the top into which the pins of the cope plate fit. It is made large enough to allow the rim attached to the cope plate to pass easily inside the flask in the operation of pressing the molds. A plate of sheet steel is provided, which is of a size to cover nicely the rim on the cope plate. The construction of all these parts will be readily understood from the accompanying halftones.

Fig. 1 illustrates the top and bottom pattern, the sheet steel plate and the flask. The flange on the top matchplate is slightly wedge-shaped—thickest at the point of union with the matchplate—and when forced into the sand compacts it toward the pattern. Fig. 2 shows both sides of the same mold. The photographer has placed a mirror back of the mold, and the back and front of the object are seen at a glance.

In operation a flask is placed on any suitable bottom board and filled with sand. The cope plate is filled with sand and both flask and plate struck off. The sheet steel plate is placed on the rim of the cope plate to retain the sand during the operation. The cope plate is inverted and placed in position on the flask. The sheet plate is withdrawn and pressure is applied. The cope plate is now removed and the flask with its bottom board is placed on the molding floor, forming the bottom one of a stack of molds. Subsequent operations are the same, except that the drag plate is used in place of the bottom board, and a sprue hole is cut in each mold before the flask is lifted from the drag plate. In these molds above the bottom one it will be observed that there is the impression of one-half the pattern on the bottom and the reverse half on the top as shown in the illustration, Fig. 2, in which a mirror has been used for the background, and as they are superimposed

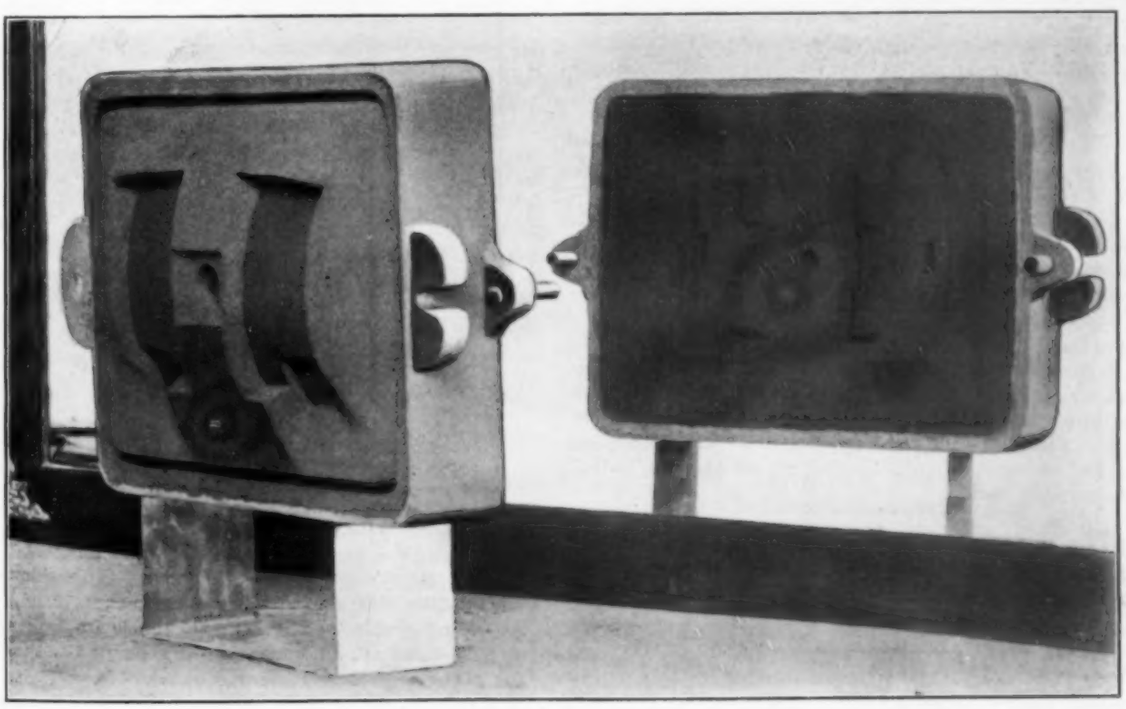


FIG. 2.—BOTH SIDES OF MOLD—ONE SIDE BEING SHOWN IN MIRROR.

on each other a complete mold is formed by each flask. Thus in a stack of ten flasks there are nine complete molds. The nine molds take the floor space of one made in the ordinary manner. Figs. 3 and 4 are stacks of castings as they come from the flasks. All are poured at the same time, and as only one part of the flask is used in the place of two, the labor as compared with other machines is just one-half and as compared

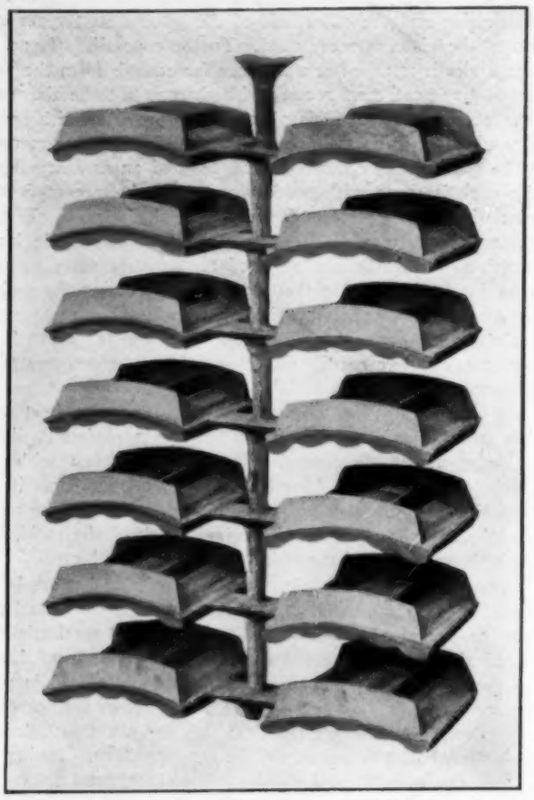


FIG. 3.—STACK OF CASTINGS MADE BY MULTIPLE MOLDING.

with hand molding is about one-fourth. In foundries fitted with compressed air or other hoisting devices the entire stack of flasks can be removed from the castings at once, as will be seen in the illustration, Fig. 5, compressed air being the power used in this instance. The accompanying illustrations are made from actual photographs in the foundry and show the variety of castings which can be made from this machine. Mr. Beckwith's rights to the invention are protected by letters patent.

Bridge Commissioner Lindenthal, of New York, on Sept. 25, opened the bid box in his office and drew forth one bid, that of the Pennsylvania Steel Co., for the steel superstructure of the Blackwell's Island bridge. The bid was for $5,255,514. Commissioner Lindenthal announced that he would reject the bid and advertise again. The bid is about $1,500,000 in excess of the estimate.

The Garrett-Cromwell Engineering Co., Cleveland, is rebuilding a blast furnace of the Ashland Iron & Mining Co., Ashland, Ky., successor of the Ashland Coal & Iron Co., and having three stacks at that place. The capacity will be increased from 150 to 275 tons a day. The Garrett-Cromwell company has a commission to buy a blowing engine, 44x84x60 inches, for the rebuilt stack.

Henry P. Lovering, president of the Lovering Harvesting Machine Co., Boston, is said to be assisted by Western capitalists in organizing a new harvester company on a large scale It is understood that the new plant is to be erected in Chicago.

The Fore River Ship & Engine Co., Boston, has discharged 500 of its employes. Every department is affected.

The Western Machinery Market.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK.

CHICAGO, Sept. 29.—Henry E. Pridmore, manufacturer of molding machinery, advises us that the demand for his machines has been very heavy all the summer and that orders on hand will keep the plant working to its full capacity for several months to come. There is no difficulty in closing new business, and from the large number of inquiries in the market, this firm sees no reason for supposing there will be any decline in trade either during the next three months or the whole of the year following. Manufacturers of agricultural implements, Mr. Pridmore states, are the heaviest buyers of his products, one order from this source, received in August, calling for 69 machines; though makers of brake shoes, journal bearings and other railway castings are active in covering for their requirements.

Hill Tool Co., Anderson, Ind., manufacturer of tool holders, machine vises, etc., reports that the outlook for fall trade is gratifying. While business in July and August was quiet, it was not expected the conditions would be otherwise, trade in these months always being dull. Increased orders are already coming in, and the company anticipates a larger volume of business this winter than it had last winter. Several shipments have been made recently to France, England, Japan and Australia.

George Whiting Co., manufacturer of punching and shearing machinery, reports a great improvement in the volume of orders closed during September as compared with several months preceding. The company notes that a large amount of business is in sight in both large and small units, and in view of this fact it believes that busi-

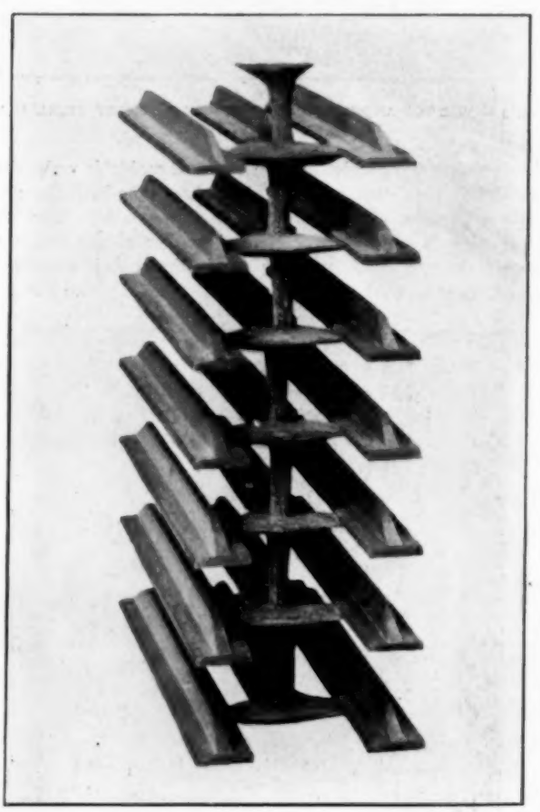


FIG. 4.—STACK OF CASTINGS AS TAKEN FROM FLASKS.

ness during the winter will be active. Collections have been a little slow during the summer, but have improved as fali approached. The company made its first export shipment last month, consisting of a set of bending rolls for Mexico. A consignment of machinery was also sent to California during the month, and the company can now claim with truthfulness that in the short space of one year

since it was organized, its machines are in use in all parts of the North American continent. The capital stock of the company was lately increased to $45,000, to enable it to purchase additional equipment for the manufacture of a heavier class of tools.

Lennox Machine Co., Marshalltown, Ia., manufacturer of punches, shears and rolls, gasoline engines and furnaces, advises us that it has noticed no decrease in its business during the summer. Beveling shears have been shipped during the month to the National Boiler Works, Chicago; Scully Steel & Iron Co., Chicago; C. E. McDaniels, Ottumwa, Ia.; Jencks Machine Co., Chippawa, Ont., Canada; Minneapolis Steel & Machinery Co., Minneapolis, Minn.; J. Inglis Sons, Toronto, Ont.; Canada Foundry Co., Davenport, Ont.; Chicago, Milwaukee & St. Paul Railway, West Milwaukee, Wis.; H. K. Porter Co., Pittsburg; Lake Shore & Michigan Southern Railway, Elkhart, Ind. In addition, the company has orders on hand for the shipment of a large number of splitting shears and tapping machines; for a carload of gasoline engines for Minneapolis, besides a great many local shipments to Minnesota, North and South Dakota, Washington, Utah, Missouri, Illinois, and Iowa. Carload consignments of furnaces have been made to Irwin, Pa.; Denver, Col.; Illinois, Iowa and Kansas City. So active has been the demand for the company's products, that an enlargement of its plant is contemplated for next spring.

Temple Pump Co., Chicago, manufacturer of agricultural machinery of all kinds, believes that business men should move slowly this coming winter in the matter of reaching out for new business. It is of the opinion that labor organizers, by their arbitrary methods, are doing much to injure the prosperity of the country, and that owing to the high costs of raw material and labor and the tendency to over-production, conservatism should be the watchword for a time at least. It advises us that there has been no falling off in the demand for its own products, notwithstanding the last few months has seen declining prices, which it attributes in a large measure to the economies and improvements that have been introduced in machinery in its line. Plans are being considered for an extension to its plant to meet the growing demand. In regard to foreign trade, the company states that orders from this source have been somewhat neglected in the past, owing to the close attention which the heavy domestic trade has demanded. Shipments, however, have recently been made to Mexico, South America and Australia.

New Doty Mfg. Co., Janesville, Wis., manufacturer of punching and shearing machinery, has under contemplation the erection of a new foundry, but may not commence work on it until next year, being busy just now completing contracts taken several months ago. Though it is receiving its share of the new business placed, the company reports that orders and inquiries are not as plentiful as was the case two to three months ago.

E. A. Delano Co., Chicago, manufacturer of power transmission machinery, pulley molding, boring and tapping machines, etc., says that, while demand for its products is good, orders are mostly of a small nature. These, however, are in sufficient volume to keep its plant busy and to warrant the purchase of several small tools which will probably be made in the near future. Inquiries relating to new business are of a satisfactory volume, the company reports; but labor troubles are preventing many manufacturers from buying their requirements.

Fox Machine Co., Grand Rapids, Mich., manufacturer of metal working and pattern shop equipment, has found business in the past two months rather slack, with indications of a slow trade this fall. It believes, however, there would be a good market this winter for new machinery, if manufacturers would have confidence in the business situation. A satisfactory export trade during the summer months with plenty of new inquiries coming in, is reported as an offset for the weak home demand.

Hill Machine Co., Anderson, Ind., manufacturer of pumping machinery, etc., reports among its recent sales and shipments, orders for a complete pumping plant for the county court house and jail, Anderson, Ind.; a number of deep well pumps for Pittsburg; one combined gasoline engine and pump for railroad work at Pittsburg; and various kinds and sizes of pumps for Memphis, Tenn.; Rockport, Ind.; Newport, Ind.; Kansas City, Mo.; Sharon, Pa.; Toledo, O.; Chicago, Ill.; Kokomo, Ind.; Seattle, Wash.; Elkhart, Ind.; Salt Lake City, Utah, and other points.

Nordberg Mfg. Co., Milwaukee, Wis., manufacturer of Corliss engines, has its order books well filled, but notes a falling off in inquiries and new business.

Union Steam Pump Co., Battle Creek, Mich., replying to questions regarding its foreign trade, expresses the opinion that the United States is losing ground abroad owing to the active competition of Germany and the tardiness of our Government in adopting a more equitable tariff arrangement with regard to certain lines of products on which it believes import duties should be modified. The company reports that while its sales during the past month to foreign and home consumers have been satisfactory, it observes a slacking up of trade in all directions.

Charles H. Besly & Co., Chicago, are optimistic regarding the outlook for business this fall, orders and inquiries received during September being of an encouraging volume. An exceptionally good demand for Helmet oil has been in evidence during the month, and sales of large quantities of the Badger and Bonanza oil cups have been made chiefly to manufacturers of agricultural implements, iron working machinery and automobiles. Shipments of Gardner grinders have also been made to firms in all sections of the United States and several to Europe, and there has been a good demand for Helmet temper taps. The company's foreign trade is satisfactory, inquiries from South America and Mexico being noteworthy.

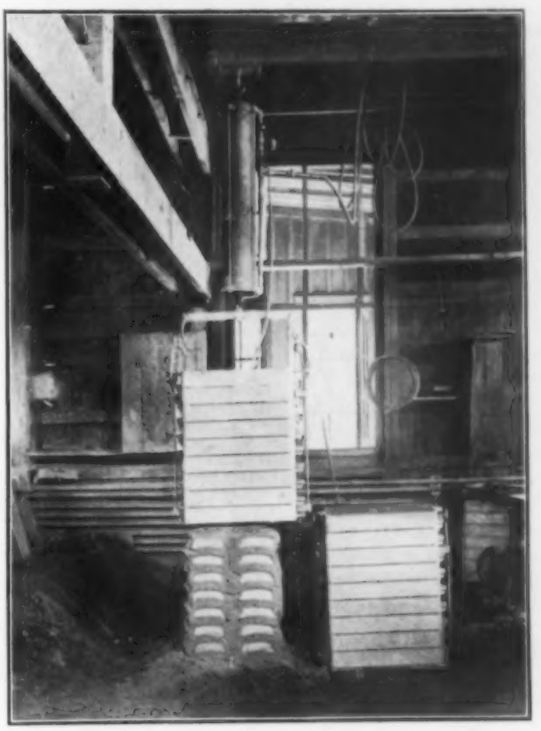


FIG. 5.—SHAKING OUT COMPLETE STACK OF MOLDS AT THE ONE OPERATION.

Holthoff Machinery Co., Cudahy, Wis., manufacturer of mining machinery, has made plans for an addition to its boiler and sheet metal shop, extending it about 200 feet and practically doubling its capacity. The company is also adding considerable new machinery to its machine shop, and has broken ground for the erection of a foundry, all of which it expects to have completed by the first of

the year. A good demand has been felt during the past month for mining machinery and equipment, and it reports that new inquiries are being received daily. Recent shipments from its plant include a large pipe line for the Pike's Peak Hydro-Electric Co., Colorado Springs, Col.; a pipe line for the Utah Sugar Co., Salt Lake City, Utah; mining machinery for the Old Dominion Copper Co., Arizona, and the British Columbia Copper Co., in British Columbia, together with a number of smaller orders. A contract is daily expected from Mexico for stamp mill and accessories to be shipped to Oaxaca, which is the only foreign sale for the month. Bignall & Keeler Mfg. Co., Edwardsville, Ill., manufacturer of pipe threading and cutting machines, is adding to its plant an erecting floor. No new machinery will be required. The company reports that while inquiries are in the same volume, it is very difficult to close business. One export order has been received during the month and several orders from American firms for 12-inch machines.

Harding Brothers, Chicago, manufacturers of precision bench lathes and attachments, etc., report a fair demand for their line of tools, and in view of inquiries expect a good business all through the winter.

National Machine Co., Milwaukee, manufacturer of speed lathes, and general machinist, reports that the trade outlook is very good. Six speed lathes with set-over tailstock and two slide rests have been shipped during the month to the Comstock Brass Mfg. Co., Pittsburg, and six assorted lathes and one slide rest to the O. L. Packard Machinery Co., Chicago. Inquiries have also been received from Belgium from which the company expects to close some business.

S. Freeman & Sons Mfg. Co., Racine, Wis., manufacturer of agricultural implements, boilers, etc., reports that the orders for boilers already booked will keep this department busy until the first of January, and that from the nature of inquiries coming in it anticipates a good demand all through the winter. Orders for implements are in fair volume, and with the dissipation of the reports that the crops had been ruined by the recent cold snap, it sees no cause for any falling off in this trade.

Consolidated Press & Tool Co., Chicago, builder of presses, dies, sheet metal tools, etc., is getting out a new line of punch presses and its shop is extremely busy. Since starting in business last May, the company reports it has taken a number of nice contracts for special machinery, including one for $25,000 for an automatic plant for making car seals.

Crawford & McCrimmon Co., Brazil, Ind., manufacturer of mining machinery, has had a steady run of orders all through the summer. From the inquiries in the market, it sees no reason for supposing there will be any decline in the demand for coal mining machinery, and in view of an active winter is making plans for the erection of a two-story brick building, 150x40, which will be used for offices and drafting rooms. A large foundry will be built next year. Recent orders taken include the following: Enterprise Coal Co., Bicknell, Ind., one pair 15x30 direct motion hoisting engines; Union Coal Co., Hymera, Ind., one pair 20x36 direct motion hoisting engines; Egyptian Coal and Coke Co., Harrisburg, Ill., two pair 18x32 direct motion hoisting engines; Quemahoning Coal Co., Somerset, Pa., one 20-ft. fan complete; West End Coal Co., Scranton, Pa., one 8-ft. fan; Standard Supply & Equipment Co., Scranton, Pa., two 15-ft. fans complete; Meadow Brook Coal & Coke Co., Fairmont, W. Va., one 12-ft. fan complete; Erie Coal & Coke Co., Meyersdale, Pa., one 12-ft. fan complete; Virginia Iron, Coal & Coke Co., Bristol, Va., one 20-ft. fan complete; Wyoming Coal Co., Omaha, Neb., one 12-ft. fan complete; Pittsburg & Meadow Lands Co., Pittsburg, one 20-ft. fan complete; Alton Coal Co., Lloydell, Pa., one 16-ft. fan complete.

Armstrong Bros. Tool Co., Chicago, manufacturer of lathe and planer tools, reports that the outlook for trade is very satisfactory, the current month being especially marked by the heavy shipments to the various shops of the United States Government and of railroad companies. There is a gradual improvement in the company's export trade, and instead of being confined to European countries, as was formerly the case, the company states that it is spreading to other countries which heretofore have consumed little or none of its specialties.

Brown Corliss Engine Co., Corliss, Wis., manufacturer of heavy duty Corliss engines, rolling mill equipment, etc., reports that it has shipped during the month just closed machinery to the value of over $125,000. While comparatively few orders have been placed in the past two months, a great many inquiries are hanging fire which it is believed will be placed in the near future. On the whole it is satisfied with the trade outlook.

Browning Co., Milwaukee, Wis., manufacturer of dynamos and motors, says the outlook for trade is about the same as it was last spring. No noteworthy orders have been closed during the month, but shipments of motors in lots of one to twenty have been made to all parts of the United States. Report orders are also coming in briskly.

Dings Electro-Magnetic Separator Co., Milwaukee, manufacturer of magnetic machines for recovering shot iron from foundry refuse, separating metals and concentrating ores, etc., states that its business is rapidly increasing, sales of the current year to date showing an increase of 60 percent as compared with those of last year. The company recently moved into new and larger quarters, but owing to the increased demand for its machinery, reports that further space is necessary. Among the orders received during September, was one from the Santa Fe Railway System for the equipping of the five different foundries of this company with magnetic separators.

Reeves Pulley Co., Columbus, Ind., manufacturer of wood split pulleys and power transmission appliances, sees nothing on the general business horizon to warrant any fears of bad times, nor at the same time does it see any indication of a phenomenally big trade this winter. It reports that from its experience, the buying public is acting conservatively in the matter of extensions and purchases of new machinery, which, it believes, is the best evidence of a continuance of good times. The volume of orders received by this company during September is in the same proportion as during the preceding sixty days, and all its departments are kept comfortably busy.

American Machinery Co., Grand Rapids, Mich., manufacturer of pattern shop equipment and wood-working machinery, reports that the outlook for trade from the standpoint of demand for its own products is very flattering. The past two months have been dull, as is usually the case every summer, though the sales of July and August of this year show an increase of 25 percent over those of the same period of last year, with more than the usual number of good prospects and actual orders for future shipment. The company's export trade is handled through its office in Manchester, Eng., which reports a satisfactory demand, though conditions abroad have been somewhat similar in the summer months to those at home. Recent shipments include an Oliver Universal saw bench and No. 3 Oliver wood trimmer to R. Hoe & Co., New York; four Oliver Universal saw benches, one Oliver hand jointer and three Oliver wood trimmers to the Atchison, Topeka & Santa Fe Ry.; one Oliver Universal saw bench and one No. 6 Oliver wood trimmer to the James Millikin University, Decatur, Ill.; and Oliver wood trimmers to the following firms: American Steel & Wire Co., McKees Rocks, Pa.; Chicago Burlington & Quincy R. R., Hannibal, Mo.; E. Long Mfg. Co., Orillia, Canada; Pittsburg & Lake Erie Ry. Co.; Oliver Universal saw bench to the Portsmouth Navy Yard; Oliver Universal saw bench and sand jointer for the South Georgia & Florida Ry., and wood trimmers for H. R. Ives & Co., Montreal, Canada; Crompton & Thayer Loom Co., Worcester, Mass., and National Electric Co., Milwaukee.

Stephens-Adamson Mfg. Co., Aurora, Ill., manufacturer

of elevating and conveying machinery, reports that it has plenty of orders on hand and numerous inquiries coming in, and that the outlook for trade this winter is very good. The company is building an addition to its machine shop, and has placed contracts for new machinery to be installed within the next few weeks.

Minneapolis Steel & Machinery Co., Minneapolis, Minn., builder of steel structures, etc., and manufacturer of Corliss engines, advises us that it has no complaint to make of the business situation. Its shops are exceedingly busy and enough business is booked to keep them so for several months to come. New business is of satisfactory volume.

Curtis & Co. Manufacturing Co., St. Louis, Mo., manufacturer of air compressors and hoists, pneumatic appliances, saw mill machinery, etc., finds the demand for its machinery is as good if not better than it has been for some time past. The company reports that it is rapidly outgrowing the capacity of its present plant, and that it is only a question of time before an entirely new plant will be erected. No noteworthy orders have been taken during the month, but shipments of various kinds of machinery have been made to Germany, South Africa, Massachusetts, Minnesota, Florida, California and Washington, within this period.

Fisher Governor Co., Marshalltown, Ia., manufacturer of steam pump governors, etc., advises us that from the standpoint of its own sales, it believes business in the balance of this year will be as heavy as in the nine months past. Shipments in August were not as heavy as in the same month in 1902, but the company accounts for the discrepancy by the fact that the Texas oil companies were heavy buyers a year ago. In the past month, a large shipment was made to a steel foundry in Pennsylvania.

Roth Bros. & Co., Chicago, manufacturers of dynamos and motors, give their opinion as to the trade outlook in the statement that they have just doubled the capacity of their plant. Orders during September have been in satisfactory volume, and new inquiries are plentiful.

Tidewater Steel Co.

The stockholders of the Tidewater Steel Co. at their annual meeting elected the following directors: Evans R. Dick, George S. Graham, George McCall, Charles A. Porter, Russell W. Davenport, Charles T. Schoen, A. S. L. Shields, C. E. Stafford and F. W. Wood. President Stafford, in his annual report, says: "The gross business of the company for the year was over $2,000,000. The production of the open-hearth increased about 58 percent, the 112-inch plate mill about 38 percent and the 72-inch plate mill over 60 percent over the production of the year previous. The direct loss of profits owing to increased cost of fuel, inability to move freight, etc., is estimated at between $130,000 and $150,000. The $134,000 which had been spent for the upkeep of the plant (outside of the sum spent for general improvements) has been added in the cost of production, leaving a gross profit of about $162,000, which, after deducting $125,000 for office expenses, salaries, interest, dividends, maintenance and reserve fund, etc., left $36,500 to be passed to credit of profit and loss, which increased that fund to $93,500."

The Lookout Mountain Iron Co. expects to be making iron in its new plant at Battelle, Ala., in February. Some coal from the mines on the hillside adjacent to the furnace site was dumped this week. Seventy-five of the coke ovens have been completed and fires will be lighted as soon as sufficient coal is dumped.

A NEW METHOD OF KEYSEATING.

There are a number of different methods of keyseating shafting where the keyseat is in the center of the shaft or on the end and it is necessary to round up one end or both. The usual method is to drill a hole on one end or both ends of keyway, shape or plane the groove and finish up the end by chipping into shape; this is an awkward job, but does it much quicker than with a cotter drill; the cotter drill, however, leaves a perfect keyway.

To overcome these difficulties the Newton Machine Tool Works, of Philadelphia, designed a double spindle milling machine, which produces entirely the same results as a cotter drilling machine, and does it in very much quicker time. The entire machine is seen at Fig. 1, and Fig. 2 shows the tool milling out a keyway. The machine is designed with two spindles. The horizontal spindle extends beyond its bearing,

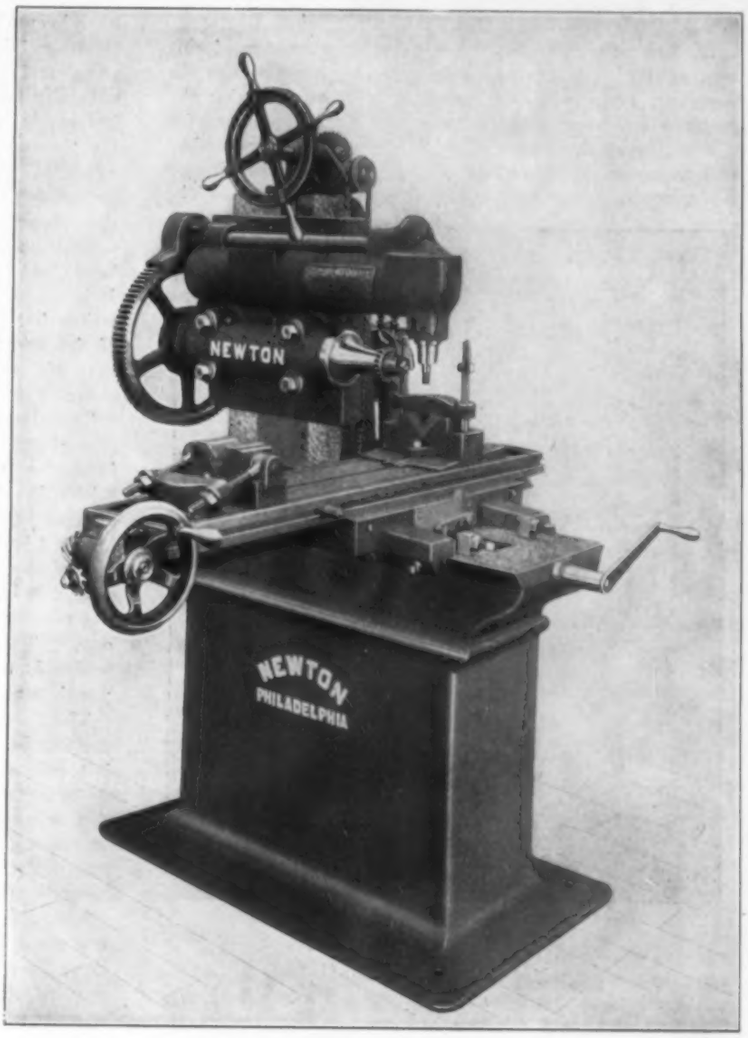


FIG. 1.—A METHOD OF KEYSEATING.

and there is furnished a cutter of the proper width for the desired keyway. With each cutter is furnished a washer marked for a certain width of keyway. When the washer and cutter are placed on the end of the spindle, the center of the horizontal cutter is directly over the center of the V-block on which the shaft rests; that is, when the saddle is adjusted to the stops on the far side of the bed. With this horizontal cutter the majority of the stock is removed, leaving the keyway finished with the exception of the ends where the stock is left by the radius of the cutter.

After this portion of the work is done, the spindle head is raised and a cutter of the same diameter as the width of the horizontal cutter being in the vertical spindle, the saddle is adjusted to the stops as shown on the front of machine, bringing the center of the vertical spindle directly over the keyway

already milled, and the cutter is then used to round up the ends of the keyway.

Having these stops and washers for the horizontal cutter entirely eliminates any setting of the machine, with the exception of the depth of the keyway, and with a micrometer on the spindle handwheel, the desired depth can be obtained.

The machine is provided with a pair of V-blocks and clamps. The front V-block is rigid, and the rear one is on a taper base, so that when keyways are to be cut in shafts of two diameters, the rear block can be adjusted to keep the shaft in line.

These machines are built in two sizes: No. 1 for milling keyways in shafts up to 4 inches in diameter, carriage of the machine 44 inches long with a feed of 24 inches. No. 2 machine is designed for milling keyways in shafts up to 8 inches diameter, the carriage of the machine being 60 inches long with a feed of 30 inches.

Troubles of Two Ohio Companies.

W. S. Krake, Ravenna, O., representing a number of citizens of that town, has filed suit to recover $19,000 from the American Foundry & Machine Co. It is asserted that the company agreed to invest $150,000 and employ 100 men for 5 years, that a large number of people were induced to buy real estate on the strength of this promise, and that $11,500 was turned over to the company from the sale of lots. The

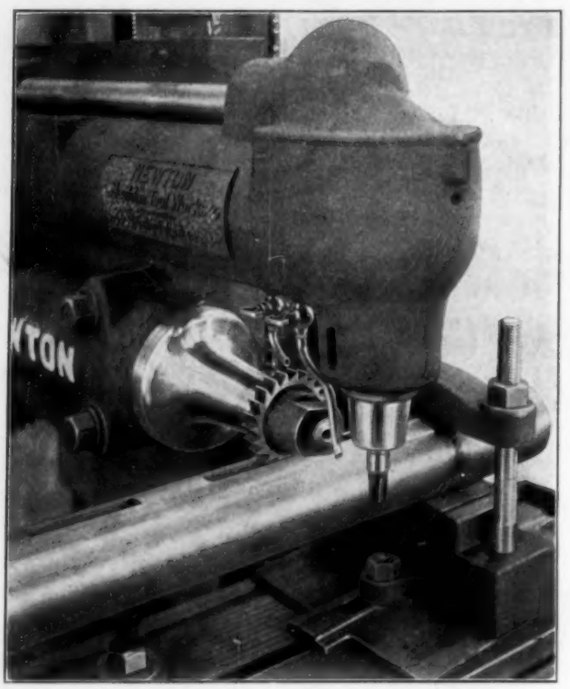


FIG. 2.—MILLING THE KEYWAY.

company was organized about 2 years ago by Lane & Wallace, of Cleveland, to manufacture mining and other machinery. The firm of Lane & Wallace had serious disagreements and much bitterness arose, in which the people of the town took part, some being friendly to Lane and others to Wallace. Lane & Wallace were not able to operate the plant, which was leased to Geo. H. Bowler & Co., of Cleveland. The latter company has recently had internal troubles of its own, and although it was connected in no way with the Ravenna concern, the plant at Ravenna has been closed for the present and its future is uncertain. Carl Dautel has been appointed receiver of Geo. H. Bowler & Co. on motion of the senior member of the company and its affairs are now being readjusted. The failure was not due to lack of funds, and all creditors will be paid in full. Mr. Bowler, who has been a very successful business man and has important interests aside from those of Geo. H. Bowler & Co., expects to be in business for himself about the first of the year after the affairs of the present company are wound up.

The Georgia Car & Mfg. Co., Savannah, Ga., has a contract to build 700 cars for the Mobile & Ohio Railroad.

Cleveland Machinery Market.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Sept. 30.

There is unquestionably a diminution in business in some lines, especially in giving orders for new construction, as shown in the offices of engineering companies; yet few manufacturers are willing to be quoted as saying that business is poor and some offer evidence of continued prosperity. One manufacturer, who says his own business is very good, writes as follows about general conditions:

"We are in receipt of your favor relative to trade conditions. In answering your question one has to sharply distinguish between what we might call real conditions of trade and what we might call unreal conditions. These real conditions remain, of course, just exactly as they have been all the while. There is the same great country to serve, the same great country to improve and develop, and so if this was the basis of trade we should naturally be just as busy now as we have been; but unfortunately these real conditions do not govern trade. On the one hand, the speculator seems to think that he can continue to print his securities by the million and go on selling them indefinitely, and on the other hand the labor leader seems to think there is no end to what a long-suffering public can stand, and these two elements have probably brought an end to the so-called boom. It is therefore the opinion of manufacturers so far as the writer has any knowledge that we have reached the end of the so-called good times; now we shall have to be content with anything until these two classes mentioned get some of the nonsense jolted out of them."

The Garry Iron & Steel Co. is doing a good business in cranes and other machinery. Inquiries are numerous and in most cases mean business.

The Cleveland Pneumatic Tool Co. is behind in its orders and has just installed machinery to enable it to catch up.

The Cleveland Crane & Car Co. is busy, but finds that many parties contemplating installation of machinery which it builds are holding their final decision and are not placing contracts as readily as they did three months ago. There is, however, a large amount of business which is practically ready to close, and from the company's standpoint the trade conditions are very good.

The C. O. Bartlett & Snow Co. reports that inquiries are coming in more readily, and it is securing more orders, but prices are extremely close, and it believes there is no question that there is a downward tendency; and that a general decrease of business, and the wonderful increase of foreign immigration, which is being emptied into New York every day, will soon cause a surplus of labor, consequently lower prices.

The Cleveland Punch & Shear Works Co. has found trade in its line rather light for the past month. Conditions have improved a little within the past two weeks, and it is hoping for a greater volume of business during the month of October.

The Elwell-Parker Electric Co. finds a disposition in some quarters to hold up a little, but in the products which it manufactures, business is good and the company has fully as many orders as in any previous year at this season.

The Marshall & Huschart Machinery Co. reports that business for the last three weeks has been very slow, but seems to have picked up in the last few days, as inquiries and orders are coming in in good shape.

The Baker Motor Vehicle Co. will erect a new plant in the spring, having purchased a tract near the plant now being erected by the American Ball Bearing Co.

The Winton Motor Carriage Co. expects to nearly double next year the output of its extensive plant. A large contract for machine tools has been placed with Strong, Carlisle & Hammond.

The Atlas Car & Mfg. Co. is far behind in its orders, and to provide additional facilities will erect a building

90x200 feet. This company shipped over 1,000 cars last month.

The Vulcanus Forging Co. is now removing its old machinery and will soon install new machinery, confining its product entirely to rivets and air brake pins.

The Cleveland Elevator Bucket Co. has enjoyed exceptionally good business the past six months and prospects seem to be bright.

F. H. Bultman & Co., general machinists, report that business with them was never better, especially in gear cutting.

The Van Dorn & Dutton Co. still has plenty of work on hand and the outlook for the future is sufficiently encouraging to warrant it in the purchase of new machinery. Orders have been placed for several new special machines for cutting spur gears and for planing bevel gears. When they are received the company expects to be able to take care of all orders with promptness.

The Chisholm & Moore Mfg. Co. reports a continued good trade in both its machine shop and foundry departments. The summer has been an unusually good one with this company and it feels confident that there is a good season ahead.

Kaltenbach & Griess, consulting and contracting engineers, report that inquiries are very numerous and point to considerable new business in the near future.

The Upson Nut Co. states that business was better in September this year than in August, but not as active as in September, 1902.

The Cleveland Machine & Mfg. Co. has shipped a train of rolls to the Inland Steel Co., Indiana Harbor, Ind., and it has supplied material for improvements for the Emma Furnace, Cleveland.

The Cleveland Twist Drill Co. is enjoying excellent business. Orders from foreign countries, especially France, Russia and England, have been coming in freely.

The Edmunds Elevator Co. has just received the following orders: One sidewalk elevator for the A. K. West estate, Sandusky, O.; hand elevator for C. A. Aultman, Alliance, O.; one belt elevator for the Ney Mfg. Co., Canton, O.; one belt elevator for W. A. Tischer, Vermillion, O., belt elevator for Burford Bros. Pottery Co., E. Liverpool, O.

The Globe Machinery & Stamping Co. has installed two milling machines and a press supplied by the Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

The Reserve Press Co. reports an excellent demand for its sheet metal presses and dies.

The Cleveland Molding Machine Co. has equipped a new shop on South Water St., for the manufacture of molding machinery.

The new Perry-Payne power building on St. Clair, Erie and Muirson streets, five stories, containing 250,000 square feet of floor space, is now nearly completed. It is thoroughly modern and fire proof. Heat and power will be furnished to occupants by the company.

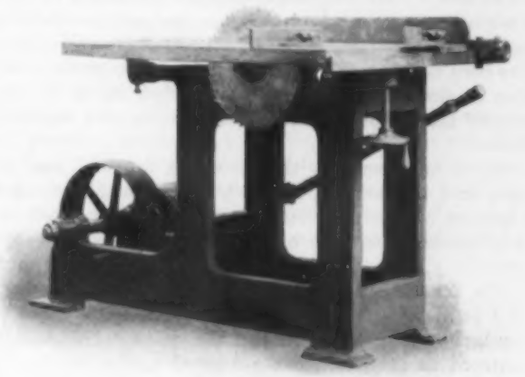
Although the pattern business is likely to be first in feeling a depression in business, the Gobeille Pattern Co. has been receiving orders for patterns for large machines in considerable numbers. Among those for September were the following, in addition to a large number of smaller orders: Sept. 2, $350; Sept. 3, $1,100; Sept. 10, $1,900; Sept. 19, $1,160; Sept. 22, $650; Sept. 23, $1,150.

Reports from correspondents of the Philadelphia *Public Ledger* in various parts of Pennsylvania show that in the iron industry nearly 8,000 men are idle, and that within a week or 10 days from 1,500 to 2,000 more will be laid off. The reason generally advanced is that the market has become overstocked, especially as to pig iron.

The Toledo Co-operative Foundry Co., Toledo, is about ready to begin manufacturing. One of its products will be an anti-friction metal designed for use in railway journal boxes, taking the place of brass bearings.

A NEW LINE OF WOOD-WORKING MACHINES.

The Badger State Machine Co., of Janesville, Wis., has been engaged in the manufacture of punches and shears, but a new department has recently been added. The new line comprises wood-working machinery, turning lathes, saw tables, jointers, etc. The illustration shows one of the new machines, a cut-off and rip saw of simple but strong construction. The frame is cast in one piece and the countershaft and belt shifter are all on the same frame. The machine is consequently quite compact, and requires a minimum amount of floor space. The table is 30 inches wide and 38 inches long and is adjustable vertically. The machine is equipped with two cut-off guides and one rip saw guide and is convenient for packing case



A NEW CUT-OFF AND RIP SAW.

work, as well as the more critical needs of the patternmaker. The arbor and slot will accommodate a 14-inch saw.

Mechanical Device for Currency Inflation.

Hans Neimend, of Ida Grove, Ia., has invented a device operating on slot machine principles, with the device serving to take the place of the time-honored custom of passing the collection box in church. The apparatus consists essentially of an air compressor, which is to be placed in the basement or some other place convenient to the church where it is to operate. From the air compressor pipes will be run to each seat in the various pews, the seats being upholstered with individual pneumatic cushions, and each one provided with a slot machine device, the insertion of a coin in which will permit air from the compressor to inflate the pneumatic cushion to a limited extent. It is evident that the more coins inserted, the more inflation of the cushion, and consequently more comfort for the occupant of the pew.—[Scientific American.

Corporation Counsel Rives, of New York City, has directed Bridge Commissioner Lindenthal to deduct $175,000 from the bill of $231,621.59 rendered by John A. Roebling Sons Co. for the construction of wire cables and suspenders on the Williamsburg bridge. The reduction is at the rate of $1,000 per day for 175 working days consumed in the execution of the work in excess of the time stipulated and the extensions granted.

The Lorain Car Co., Lorain, O., is being organized with a capital of $200,000. It will be incorporated under the laws of Delaware, and half of the stock will be preferred and half common. The plant will be 200x400 feet, and will turn out suburban electric railway cars. The capacity will be about 200 cars per year.

The 15th annual meeting of the American Boiler Manufacturers' Association will be held at Chattanooga, Tenn., Nov. 10-13. The labor question and the question of employers acting together will be discussed. It is expected that representatives of many of the large boiler manufacturing concerns in the United States and Canada will be present.

The National Rolling Mill Co., of Hartford City, Ind., is about to remove to Vincennes, Ind. It expects to be running at the latter place by the first of the year.

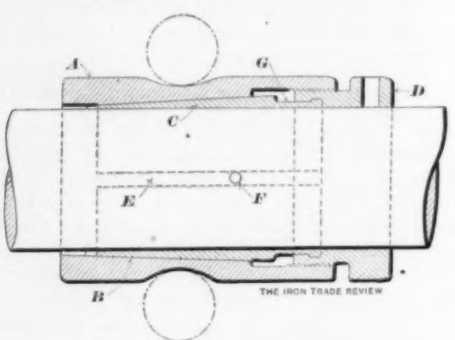
Some New Things for the Shop, Chiefly by Way of the Patent Office.

Fastening Collars to Shafts.

A simple scheme for attaching parts—collars, pulleys or anything of the kind—to shafts has been patented by Ernst G. Hoffman, of Chelmsford, England. The device could be arranged to serve as a coupling for securing one shaft to another, as the invention belongs to that class in which a cone forms the connection between the parts to be coupled. The movement is obtained from a threaded nut engaging both the cone and the part to be fastened to the shaft or which forms part of the securing device. In all probability the contrivance has been designed in the first place for fastening the cone portion or sleeve of a ball bearing to a shaft but as already indicated the use of the method may be extended beyond these limits.

The arrangement has the advantage, no small one, by the way, in a ball bearing, in which the nut and cone after engagement are more or less permanently held together so that they can be handled as one piece. This is no little convenience in placing the parts in position or removing them.

The illustration shows a section of a collar forming part of a ball bearing held to a shaft according to the terms of the invention. It will be seen that the collar A, which is to be fastened to the shaft, has a tapered portion at B. Inside the latter part is the tapered cone C and this is split at E, the split or gap at E being engaged by a pin F on the inside of the collar so that the part A cannot turn on the cone. The cone



GETTING A GRIP ON A SLEEVE.

C is recessed at G so as to leave a shoulder at the end. A recess in the interior of a nut D has a shoulder extending into G, while the exterior of the nut is threaded to fit corresponding threads on the inside of the collar A.

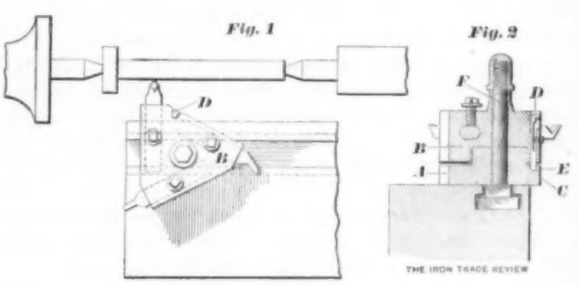
The cone and nut are first engaged together by compressing the former until the shoulder of the one can pass over the shoulder of the other as it is inserted into the interior of the nut, the parts engaging loosely as soon as the cone is allowed to expand. The nut and cone are then slid on to the shaft and into the collar, the screw thread on the nut engaging with the thread of the collar, which when the nut is rotated in the one direction will draw the collar A tightly on the cone and in turn compress the latter on the shaft. When the nut is twisted in the other direction the collar A will be pushed off the cone. The combination is neat and will not fall to pieces when removed from the shaft.

A Tool Turret.

Omar L. Brainard, of Verdi, Nevada, has invented a tool turret for lathes which has several good qualities in combination with others. The design is deficient in complication, perhaps too simple in fact, but this is a matter of opinion. The tools can be readily removed or inserted as the case may be; the cutting plane can be easily adjusted to the work on the centers of the lathe; a number of tools suitable for different kinds of work may be employed, as in the case of other turrets, and the device quickly operated to bring any tool desired into service. The inventor asserts that he has made an attempt "to combine these various functions in a device which will be simple of construction, efficient in operation, and inexpensive to manufacture." How far he has been successful can be ascertained from a study of the engraving and the following explanation:

Fig. 1 is a plan view showing the contrivance applied to a lathe rest and its relation to the work on the centers of the machine. Fig. 2 is a sectional elevation of Fig. 1 as disclosed by a cutting plane starting at the locking latch and thence running from north to south of the plan. Fig. 2 shows the internal mechanism of the turret and the manner of applying the same to the lathe rest. Of course the relative position of the live and dead centers, the construction of the lathe rest, etc., are of the common type, but may be of any other construction so far as regards the matter in hand. The inventor indeed goes so far as to say "they are entirely foreign to my invention." The tool turret has a base A forming the fixed member of the combination, and an upper or movable part B. The turret in plan as indicated by Fig. 1 is shaped in the form of a triangle with squared ends, a shape which like the square toolholder of the Gisholt and similar forms permits the head to be moved up close to the side of the work or to the end faces of the live and dead centers of the lathe. Three tool sockets are formed in the movable part of the turret; these sockets are parallel with the sides of the turret and there are three setscrews to hold the tool shanks.

The base A has a threaded hub C, or we may say, following the language of the patent specifications, "an integral upwardly projecting central core which is cylindrical in form and



A MULTIPLE TOOL-POST.

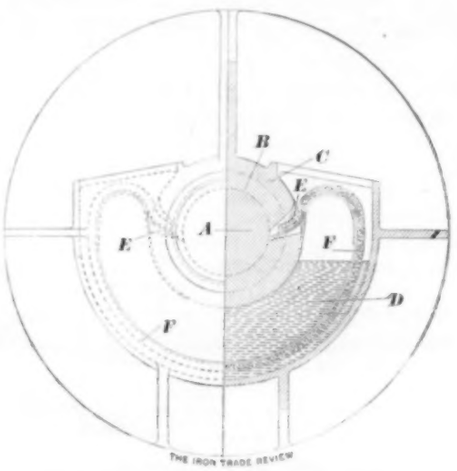
externally screw threaded." This hub enters a tapped hole in the bottom of B and in practice the upper and lower parts of the turret can be adjusted to vary the cutting plane of the tool by screwing the part B toward or from the base A. When the turret has been turned to bring the tools to the proper height for the work, it may be locked against further movement by means of a key or pin D, the pin being adapted to engage any one of a series of sockets E in the upper face of A. The locking pin D fits in a slide in the turret and has the upper end bent at right angles, so that it may be readily held out of the socket, and there is a stop entering the side of the turret and projecting into a channel in the locking pin to limit the travel of the latter. It will be seen that the upper side of the turret is extended to bring the bearing for the nut above the heads of the setscrews—a provision which will avoid some unpleasantness and is duly mentioned in the patent papers.

There are some points which, however, are not perfectly clear from the patent drawings. The language of the specifications is emphatic enough as is evidenced by the following: "It will be seen by this construction the turret may as a whole, after the tools have been adjusted to the proper cutting plane, as above described, be freely rotated on the spindle to bring any one of the tools carried by the turret into cutting position, and this without affecting the plane of adjustment." There does not seem to be any chance of fastening the turret in place on the lathe rest, except by tightening up on the threaded spindle exactly in the manner of any other toolpost. While other ways could be devised the point is in the fact that the

drawings submit no other means. When the cap nut is tightened up on the spindle, it is evident that the turret, top and bottom, is there to stay; the clamping of one clamps the other. In order to rotate the turret the whole thing must be loosened and then reset like any toolpost. A sleeve through the rotating piece could have formed a bearing for the nut as well as the toolholder part of the turret. Even this, however, would have had the disadvantage that during the turning of the turret the latter rises and falls and therefore the sleeve must be long enough to allow for this degree of movement. This elevation and fall of the turret has also the disadvantage that the tools cannot be rotated continuously in the one direction but must be turned first to right and then back again to the starting point or vice versa. A tool of this sort is likely to lose its internal and external threads, to be bored out for a sleeve, and possibly to have other changes made when it strikes the shop.

Lubricating Bearings.

A lubricating device for bearings has been developed by Joseph D. Forrer, of Johnstown, Pa., and has been assigned to the Westinghouse Electric & Mfg. Co. The invention belongs to the class in which the lubricant is conveyed to the bearing surfaces of the journal by means of the capillary action of a wick. An endeavor has been made to increase the efficiency of the arrangement by the better employment of gravity in the discharge of the lubricant and by providing means by which the wick is positively held from contact with the rotating journal.



ANOTHER WAY OF GETTING OIL INTO BEARINGS.

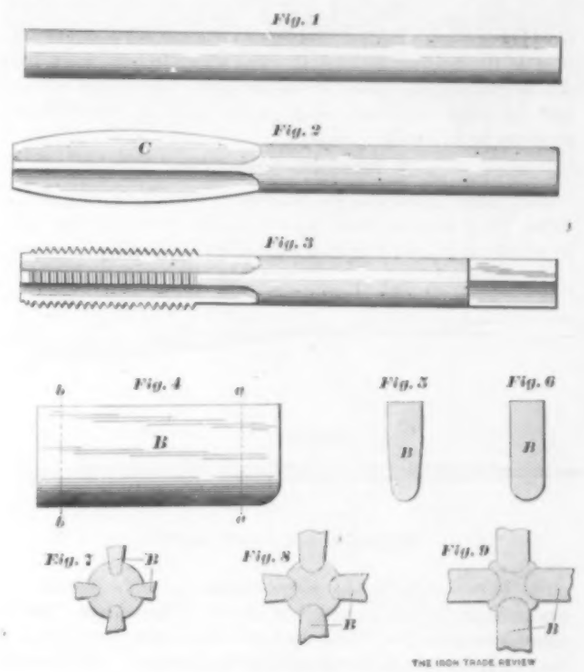
The engraving presents a view, partly in vertical section and partly in end elevation, of a bearing embodying the invention. The letter A designates the shaft journal to be lubricated; B is the brass or bushing and C the supporting frame of the machine. D is a reservoir for lubricant. An opening is shown as cored in the frame C and extends underneath the bearing and up at each side of the same to about the level of the top of the bushing B. There are openings E extending down, as well as inwardly, at opposite side of the box C and the bushing B, and these communicate at their outer and upper ends with the top of the reservoir.

A wick F lies in the reservoir D with the ends bent downward and into the openings E. This is maintained in position by a flexible backing strip of metal or any similar substance and this has fingers at the ends which engage the box C and hold the ends of the wick centrally in the openings E and out of contact with the journal. The oil which rises in the wick by capillary attraction after passing through the bend into E is aided in its discharge by the action of gravity, and the end of the wick being free it will be constantly discharged into the pocket formed at the inner end of the openings and in contact with the journal. The ends of the wick being thus positively held away from the journal are not affected by the rubbing action and discharge oil freely so long, of course, as a sufficient quantity remains in the reservoir. The device is therefore well adapted to bearings which cannot be closely watched.

A Process of Making Tap Blanks.

Frederick N. Gardner has assigned a patent for a process of making tap blanks to Charles H. Besly, of Chicago. The invention "relates to a novel method of manufacturing blanks for screw taps of that class provided with a plurality of symmetrically and longitudinally disposed lands separated by a like number of clearance grooves, said lands being adapted to be provided on their outer faces with cutting teeth to produce the finished product." This explanation clearing up the question of what kind of screw tap is involved, may be followed by saying that the main feature of the scheme is to avoid the waste of time and material incurred by the common method of grooving taps and turning down their shanks.

The tap blank is made from a rod of uniform diameter, equal to that of the shank of the finished tap and about the length of a tap. The rod is first heated at the end on which the cutting teeth are to be formed, and brought to a forging heat, so that it will easily flow under pressure, and is then subjected to the pressure of a series of radially movable dies. These dies crowd the metal outward and thus form the grooves and lands of the tap. The radial pressure of the dies against the blank to form the clearance grooves causes the metal to be shifted both radially and laterally outward but to little or no extent endwise so that the ribs or lands on which the threads are



THE MAKING OF TAPS.

formed after the swaging of the blank has been completed, extend outside the circumference of the shank and in this way give to the cutting end of the tool the required increase in diameter over the size of the shank.

The grooves are formed by the operation of two or more sets of dies having different widths of working faces. The set of dies used in the initial step of the swaging process having thin edges which act along narrow strips of the blank and form grooves without appreciably lengthening the blank and the working faces of the dies used in the succeeding operations being made of gradually increasing widths and adapted to shift the metal sideways, the full size of the grooves are finally attained without adding to the length of the tap materially. The first set of dies are forced into the stock to the full depth of the finished groove so that the work of the following dies is only to widen the grooves.

The set of engravings illustrate the steps in the manufacturing process of making a plug tap in the manner covered by the patent. Fig. 1 is a view of the plain cylindrical blank or rod from which the taps are made. Fig. 2 is a view of the blank after the clearance grooves C have been formed and before the threads have been cut on the lands, and Fig. 3 is an elevation of the completed tap. Fig. 4 is an elevation of one of the

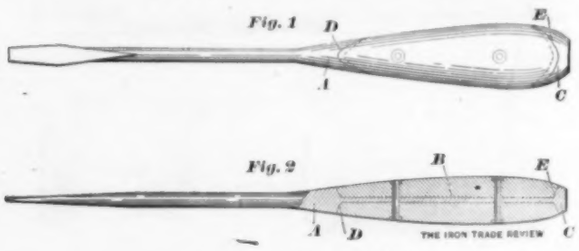
dies B, and Figs. 5 and 6 are transverse sections of the die, illustrated in Fig. 4, the sections being taken respectively at the points designated by a-a and b-b. Figs. 7, 8 and 9 illustrate in transverse sections the different stages of forming the grooves when they are made by the combined work of three sets of dies.

The working faces of the dies are formed to make deeper depressions at the ends of the grooves nearest to the shank than at the outer ends and the dies for this purpose have the working faces inclined from one end to the other as shown in Figs. 4, 5 and 6. The ends of the dies which form the inner ends of the grooves are rounded as seen at the right-hand lower portion of Fig. 4, so that the grooves become gradually shallower until they merge into the cylindrical surface of the shank.

The clearance grooves are formed by three sets of dies B and the manner of using them for this purpose is shown at Figs. 7, 8 and 9. A set of dies for the first operation is illustrated at Fig. 7 and it will be noted that the working faces of the die are much narrower than the completed grooves. The initial set of dies are, however, forced into the blank to a depth equal or nearly so to the full depth of the grooves in the finished tap. The second set of dies are depicted in Fig. 8, and are provided with wider working faces than the initial set; and the third or final set, when the swaging process is a three stage one, is shown in Fig. 9. In the last set of dies the working faces are made of a width to correspond with the contour of the finished grooves C. The blank has the teeth then cut by the milling cutter or in any other convenient method and the outer and inner ends of the lands or ribs trimmed to shape as in Fig. 3.

A Patentable Screw-Driver.

The patent taken out by William S. Ward, of Plantsville, Conn., is, if nothing more, an exhibition of the possible ways in which an expert can name the different parts of a simple



IMPROVING THE SCREW-DRIVER.

tool. How much of the nomenclature is to be credited to the attorney is not known, but clearly a fair share. Unlike many inventors, Mr. Ward does not make numerous claims at the outset for the objects sought by the designer. Perhaps the simplicity of the instrument was an effectual bar to such a course but that does not appear to have much influence upon other patentees and in the present instance the initial deficiency was corrected later.

Two illustrations are exhibited, one partly in section. The specifications explain the device as follows: "The blade gradually merges into the lower end of the round shank, while the upper end of the round shank is joined by the conoidal bolster A. In continuation of the bolster is the flat handle web B; the upper part of the web is joined by the handle butt C having a hammer face at the extreme upper (right-hand) end. The butt C joins the web on a curved line in side view with a slanting or beveled face E as shown, the base of the face being indicated by the curved broken line at the upper part of Fig. 1. The junction of the handle web and bolster forms a similar face D and presents a figure in side view that may be described as a V with the bottom rounded. The base of this face is in like manner indicated in broken lines in Fig. 1. The blade, shank, bolster, handle-web, and butt are all formed integral of one piece of drop forged metal."

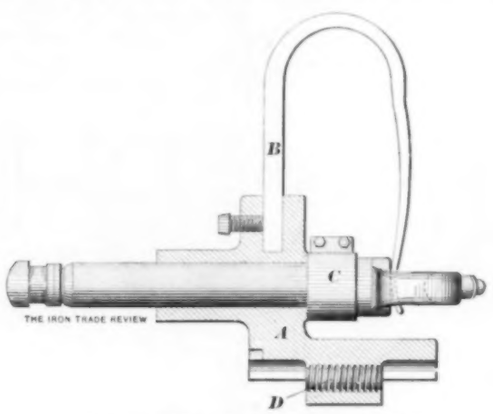
The above has been slightly condensed but follows the lines of the original. There are handle scales fitted to the two sides of the web at D and E, the web being perforated for rivets to hold the parts together. The hammer face at the end of the handle has sufficient weight behind it to make the combination effective in starting screws and the design as a whole is pleasing. More can be said of it, however, and the inventor further remarks: "I deem the conoidal shape of the bolster and lower part of the handle, merging from an elliptical cross section into the circular one of the blade shank by a gentle taper without any shoulder or abrupt break, as important, because it permits the operator, while maintaining a firm grip upon the main portion of the handle, to bring his finger and thumb down upon the bit shank to control the point of the blade with great nicety. I also deem as important the particular form of the handle scale, receiving faces of the bolster and butt of the metal part of the tool, which are readily manufactured by drop forging."

A Pneumatic Hammer as Part of Another Machine.

That a pneumatic hammer can be readily applied to another machine is apparent to any mechanic of experience, and one of the methods in which this may be done has been patented by Charles R. McKibben of Pittsburg.

The automatic hammer illustrated is of familiar construction. The carrier for the hammer is represented at A and a seat is formed in the carrier of a suitable shape to receive the hammer and to permit it to be advanced and withdrawn. A strap spring B of horseshoe type serves to hold the hammer forward in the carrier. The strap spring is rigidly mounted in the carrier A and held in place by a setscrew, the free end bearing upon a portion of the hammer. As will be seen, the strap spring B may be promptly removed and the hammer withdrawn from the carrier.

A lug or shoulder is shown on the hammer as at C and this abuts against a spot on the carrier and limits the advance



PNEUMATIC HAMMER AS A MACHINE DETAIL.

movement of the tool in the holder. A screw thread formed in the carrier at D indicates the manner in which the carrier may be adjusted and attached to a support on some suitable machine.

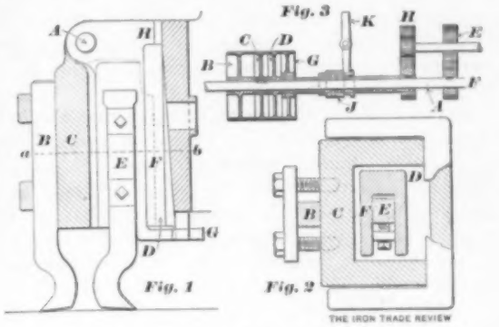
Doubling Up the Planers.

In accordance with the natural law which brings many minds at work simultaneously on the same thing there is now an additional interest abroad in planer tools. We have already illustrated some examples of what is being done of late on this side the Atlantic in this regard and now, by way of the *Mechanical Engineer*, submit two examples of recent attempts to make the planer do more than an air cut on the return stroke.

Figs. 1, 2 and 3 show a double toolholder as well as an arrangement for gearing the planer on either double or single tool work. Fig. 1 is a side view and Fig. 2 a section on the line a-b of a double acting toolholder. The double toolholder may be swung on a pin passing through the hole A so that each section of the holder is free to move independently of the other, the two sections of the double toolholder facing in opposite directions and the entire holder being carried on the guide and connected to the feed screw in the usual way. The working of the device is as follows: Supposing the planer bed carrying the work, is on the inward stroke, tool B will come into operation in the ordinary way, the tool C bearing against the surface D while the tool E trails. At the end of the stroke, the tool E will come into position by its own

weigh and cut on the return stroke, the toolholder F bearing against the surfaces as at G and being held rigidly while the tool B trails in its turn.

As regards the path of the tools on the work, it will be clear that in order to secure an evenly machined surface when the work is completed, the cuts of the two tools should overlap. The extent of the lap need not be more than sufficient to provide for any slight lessening or wear of the cutting edge of the tools during the one setting of the work. Obviously the total width of cut made by the two tools in one double stroke should be equal to the feed.



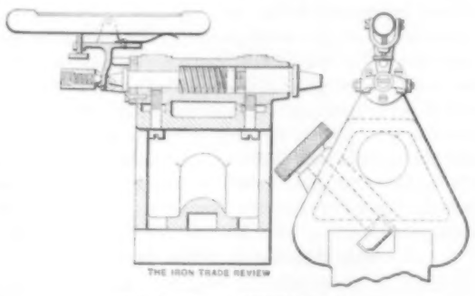
GETTING MORE WORK OUT OF THE PLANER.

Fig. 3 is an elevation, partly in section, of a form of gearing for driving a planer for work of this kind. There is a shaft A carrying the pulleys, B, C and D; B and D are the loose pulleys and C is the driving pulley. The shaft A is connected to the gear E through the gear F. When the planer is being used as above described, that is, making a cut on both the outward and inward strokes, an equal velocity during both strokes is required. In that case the straight and the crossed belts are alternately moved on to the fixed or driving pulley C in the ordinary way. When the planer is to be used single acting as in the usual manner of running these machines, gearing H is employed which provides for a quick return on the idle stroke. This gear is actuated by means of a gear and sleeve (having a running fit on A), a clutch J and a driving pulley attached to the sleeve. The gearing is put in operation by pulling over the lever K which closes the clutch J. The straight and cross belts are then applied to pulleys C and the one on the sleeve.

Both of these inventions have been designed by the Société Anonyme Westinghouse, Havre, France.

A Measuring Machine.

A correspondent of the *Scientific American* describes the application of a spirit level to a measuring machine in the way of a comparator. The machine was seen at the plant of the manufacturers, the Newall Engineering Co. of London, Eng.



SPIRIT LEVEL COMPARATOR.

Its chief novelty is the spirit level for magnifying the motion of the anvil, and some interesting results are claimed in minute measurements by this means.

A coarse screw is operated for quick movements by means of a knurled nut, and for fine movement a lever is clamped to the spindle by an eccentric on another set of levers, a thumb screw pressing against a bar. A vernier bar is graduated into tenths of an inch and a second bar is carried by the rim of a graduated wheel, the combination reading to ten-thousandths. The correspondent describes the tailstock as follows:

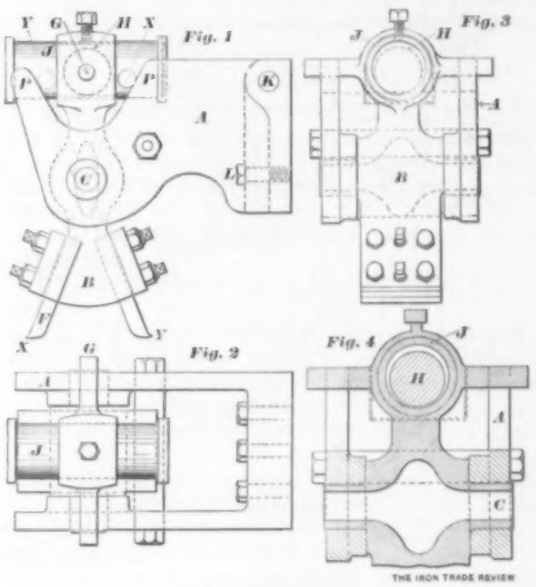
"An anvil fits in a socket, in which is an adjustable spring controlling the amount of pressure put on the piece to be measured. The tail end of the anvil comes in contact with a rocking lever, pivoted in a bracket.

"When pressure is applied to the anvil, a spirit level is displaced. The bubble on the level is first adjusted to remain at the left-hand end by means of the thumb screw. Sufficient pressure should be put on the piece being measured to bring the bubble up to a given graduation. The same course is adopted when adjusting the heads by means of end rods or with rule and microscope.

"As the movement of the anvil is magnified by the level 4,000 times, if the anvil is moved one-thousandth inch, the bubble would move 4 inches. The rocking lever is kept in contact with the anvil by a spring, which may be adjusted in the boss of the bracket previously mentioned. When the pressure is removed from the anvil, the rocking lever rests against a stop. The head and tail stocks are clamped to a true flat face on the bed, as shown in the sketch."

Another Way of Working the Planer.

This toolholder has been designed by J. A. Fraser, assistant locomotive superintendent of the Assam Bengal Railway, Gauhati, Assam. Two tools are used, one being capable of cutting on the forward stroke and the other on the return stroke. There is, however, an additional advantage of some importance; the tool not in use is lifted from the work while the other



DOUBLE TOOL HOLDER FOR PLANERS.

tool is cutting, and the dulling of the tool edge by dragging over the work during the idle stroke is avoided. Provided there is a good slice of stock removed at each cutting stroke and the clearance angle of the tool satisfactory, planer tools do not have this backward rub on the edge but the present invention proposes to make sure of the situation.

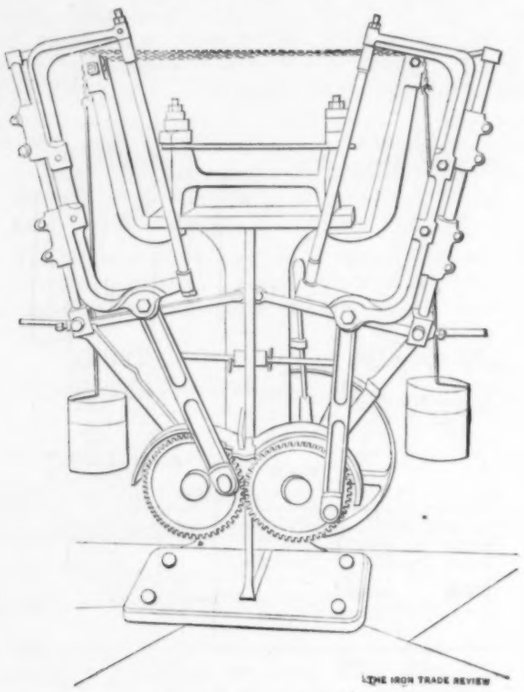
A side elevation is shown in Fig. 1, and Fig. 2 is a plan. Fig. 3 is a front elevation and a section is illustrated at Fig. 4. A is a bracket secured to the faceplate by the hinge pin K and the setscrews L. The bracket is double and the toolholder B is pivoted between the side pieces in such a manner as to be capable of an oscillating movement in a plane with the stroke of the machine. This toolholder works on trunnions C in bearings bored out in the sides of the bracket A. The oscillating motion of the toolholder B is limited in extent by the stop pin G coming in contact with the bracket A at the points P P.

A tube J is fixed to the upper part of the toolholder and located at right angles to the vertical central line of the holder and in a plane with its oscillating motion. The tube is closed at both ends and encloses a heavy ball H which is free to roll from end to end. The tube J is held in place by a screw. The tools F are fastened by setscrews into sockets and arranged to cut outwardly in opposite directions.

The action is as follows: The holder is first tilted over as far as the bracket will allow, so that the center line of the toolholder is in the oblique position Y-Y and the stop pin G is over at the left. The tool F is then in a position to operate while the other tool is swung out of the way and the weighted ball H has rolled to the lower end of the tube, altering the center of gravity of the holder and maintaining it in the tilted position until the cutting stroke commences. On the completion of the stroke the stop pin G meets a finger on the table of the planer and is tilted with the toolholder over in the opposite direction as far as the bracket will allow, bringing the center line of the holder in the oblique position X-X, lifting the tool F out of the way and bringing the other tool into action, while the weighted ball H rolls to the end of the tube and causes the holder to remain in equilibrium in the new position. At the end of the cutting stroke another stop on the table comes in contact with the stop pin G and the toolholder is swung over once more.

Forcing the Pace on Hack Saws.

An English suggestion for improving the hack saw machine is carried into effect by Beanland, Perkins & Co., of Leeds, and has recently been introduced. Like the preceding improvements on the planer, the saving of time suggested by the possibility of two cuts being made where only one was customary, has been the incentive to the design. The machine, by the way, is intended for cutting structural steel, carving the webs out of crank shafts and similar substantial work.



A DOUBLE HACK SAW.

There are two saws working alternate strokes at each side of the section clamped to the machine. The proportions of the machine will be understood from an inspection of the I-beam on the machine table in the engraving. This I-beam is 12 inches by 5 inches and it is claimed that this size section has been severed in twenty minutes, the blades not deviating from a straight line over 1-32 inch.

On reaching the center of the cut, one saw is held back by an attachment to allow the other to come through and complete the work. The feed is effected by chains and weights, the latter being adjustable so that the pressure can be graded to the keenness of the blades and the nature of the material being sawed. The frames may be held back in any position by means of catches on the rods; these are to be seen as they project horizontally at the right and left of the machine just above the weights.

The LaBelle Iron Works, Steubenville, O., is now operating eight 50-ton open-hearth furnaces, and the ninth will soon start up.

Names and Symbols in Manufacturing.

BY OBERLIN SMITH.

Among other systematic methods vital to the economical manufacture of machinery and other articles, in these strenuous competitive times, an important matter to be considered is the giving of logical and suggestive names—first, to the article produced; second, to each individual component piece thereof; third, to the various operations performed; and fourth, to the working drawings, patterns, jigs, gauges, and other special tools used in construction.

All this would be comparatively easy, after an article was once standardized for the market, providing no changes afterward occurred therein. However, as certain improvements, and perhaps simplifications, must always inevitably be made as time goes on, not only in the article as a whole, but in some of its component pieces, thus necessitating changes also in tools and operations, a comprehensive system of nomenclature is highly desirable. Such a system of names and symbols is necessary not only to identify the articles produced as they are presented to the public in catalogues, circulars, advertisements and special correspondence, but for issuing construction orders and procuring material, paying wages, keeping cost accounts and marking drawings, patterns and other tools.

This subject is, therefore, one of the first to consider in starting the manufacture of any article, and must rank in importance with the various modern means of cheapening production, such as good business management, good mechanical shop practice, piece-work and bonus systems to stimulate labor, the use of the latest ingenious special tools for producing duplicate pieces in as large batches as possible, etc., etc. It may be considered that the matters just spoken of belong more particularly to production than to distribution. This is doubtless true, but even if a selling department exists entirely separate from a manufactory a correct system of names must be used to avoid confusion with customers—not only in the original sale of the articles, but in supplying separate pieces afterwards for repairs. This is especially important in dealing with foreign customers, where a definite identification is necessary without waste of time by prolonged correspondence.

The writer has given considerable attention to this subject for a number of years past, having first analyzed it carefully in a paper entitled "Nomenclature of Machine Details," appearing in the Transactions of the American Society of Mechanical Engineers, Vol. 2, page 358. This paper was republished in the *American Machinist*, September 10, 1881, and has, by permission, been embodied in Capt. Henry Metcalf's "Cost of Manufactures," 1885, and Garcke & Fells' "Factory Accounts," published in London, 1887.

In the *American Machinist* of Nov. 17 and Dec. 8, 1888, there was published a supplementary article entitled "Manufacturing Names and Symbols." The writer's system, as explained in this latter paper, corrected some of the defects of, and supplied some omissions in, the original paper—especially as pertains to the change of design of certain pieces without a complete remodeling of the whole article, such as would entitle it to a new name. In the present essay no attempt will be made to treat the whole subject in complete detail, as a proper analysis of many different kinds of products, with examples of methods for symbolizing them as a whole, together with each of their pieces, might well fill a large volume. It may be of interest, however, to give herein an abstract of the principles set forth in the essays above referred to, together with such minor improvements as have been added in recent years.

Wide Application of the System.

It should here by understood that this matter of systematic nomenclature, with the use of symbols as a brief, convenient, and suggestive translation of the full name of an article, an operation, a piece or a tool, is applicable not only to the construction of machines, but to a host of other articles, from a toy wagon to a suspension bridge. Obviously, such a system can be used for any article which can be used and sold individually, as a needle-book, a pistol, a bicycle, a lathe, a loom, a locomotive, a plough, a pump, or a fishing-rod, to say nothing of furniture, garments, and a host of other industrial products. A line may be drawn, however, against articles sold in bulk, as grain, fluids, electricity, etc.

For convenience, certain illustrations to be given further on

will be limited to machine shop products, where some rigid system of the kind in question is more necessary than in various other lines of manufacturing. The word "article" will be used to designate the complete machine analyzed, and the word "piece" will apply to each of its component parts. Usually each of these should be named and symbolized in its ultimate condition, as one piece of a certain kind of material, disassembled from its partners. In certain cases, however, where a group of uniform pieces have been permanently fastened together as, for instance, the links of a welded chain, or the different layers of a glued or riveted belt, or fragments of wood glued into a larger whole, the group may be considered as one piece. In general, good practice to abide by, as far at least as our rather illogical and ill-defined language will permit, may be formulated as follows:

Article Name: This should be as brief yet specific as possible, to be in accordance with commercial usage—such nouns as pump, press, planer, lathe and loom being entirely appropriate as expressing each general type. It will be noticed that the first two names are identical with the verb expressing the functions of these machines. In the word planer we have an amplification of the function to plane, which is logically correct, being a noun expressing the performer of the function. In a lathe and loom we have strictly arbitrary names which, if functional, would be "turner" and "weaver." It will not usually be necessary, however, to try to reform the language in these respects—except perhaps to venture so far as to call a milling machine a "miller" and a drill-press a "driller," which is here suggested to venders in these articles as allowably innocent. In deciding upon certain adjectives for additional words of a commercial name, functional words should be used as far as possible, as "force-pump," "punching-press," etc. Frequently, however, some constructional features must be embodied as "duplex-pump," "toggle-press," etc. Sometimes anatomical words must be used, as "hand-pump," "foot-press," etc. In general, the adjectival parts of a name should be as few as possible, and should be based upon the same principles as are those of other machines of the same general type.

The Evolution of Symbols.

Obviously, the full commercial name of an article is too long for the numerous uses connected with manufacturing as written in books, tables and drawings, and as marked on patterns and tools, and sometimes upon each of the component pieces. We therefore require logical symbols, which naturally consist of figures or letters, or both. If no more than 26 articles were ever to be made in a given factory then a letter of the alphabet might be a symbol for each. As the eventual number of a certain kind cannot be foreseen, however, this is not a safe method. It is true, numbers might be used, but they are more necessary for the piece symbols, as will be explained further on, and it is, therefore, better to use some combination of letters, or letters and figures, for an

Article symbol: The character of the symbol depends somewhat upon the line of goods manufactured and their relations to each other. Other things being equal, it is best to let the symbol end with a letter, as it is usually followed by a number in the piece symbol. This, however, is not important, as in stringing together a number of symbols hyphens are always to be distinctly placed between each. The element of suggestiveness in the way of using initial letters, is important as an aid to memory. A symbol should preferably, therefore, embody the initial of the noun, and perhaps some other words, forming the name of the article. If, for example, a number of sizes and kinds of lathes are manufactured, the initial L should appear as an element in the symbol. This may be prefixed by another initial, as F L for foot-lathe or E L for engine-lathe, etc. In some cases a combination of three or even four letters, or figures and letters, must be made. The point is to get a suggestive symbol which will not be identical with any other belonging to any product that has been or ever will be made in the factory—and, furthermore, to get it in harmony with other symbols for similar products. A better plan than the above, however, is to make the symbol as far as possible agree with the commercial name of the article, which often is partly made up of figures representing a certain size, as a 20-inch lathe or a No. 4 pump. Thus these symbols might be 20 L and 4 P, respectively.

The writer, in his own practice, has abandoned the entirely unnecessary word "No." in commercially naming machines, knowing that it is briefer, and just as good, to speak of "Press 2" as of "No. 2 press." As illustrating a certain classification which he settled upon after considerable study and experience, and which has proved an excellent working system for several years past, he here quotes a published explanation which will serve as an example of some of the points in question.

Nomenclature.

The old system for naming and numbering these products has gradually (like many other people's) become somewhat illogical by the introduction of new designs and sizes. Many of these had to be inserted between others already named, with the usual result of introducing fractions and numbers out of sequence. In the choice of adjectives an effort has been made to adopt those conventionally used by the trade, but it is impossible to be wholly systematic. Thus, in regard to presses, some of the commercial adjectives in use are functional, as "cutting," "punching," "wiring," etc.; some constructional, as "toggle," "screw," "double-crank," etc.; some are anatomical, as "foot," "hand," etc., and various other names have their derivation founded on still other principles. Similar presses often being used for a great variety of functions also causes some confusion. The classification is therefore somewhat arbitrary, as in the next paragraph, functional words being used wherever posible, and those that define the majority of the work which the press will probably be called upon to do. The tables are named like the respective series of presses they represent.

Press Classification.

Proceeding in alphabetical order, all machines of the type *press* are divided into several distinct classes, as below specified, each class being named with a letter which is the initial of the first and most important adjectives describing it, as follows:

Class C, Cutting, Horning and Wiring Presses—Power, Inclinable or Fixed.

Class D, Drawing and Deepening Presses—Power, Single or Double-action.

Class E, Embossing and Coining Presses—Power, Toggle or otherwise.

Class F, Foot and Hand Presses—Lever, Pendulum, Screw, etc., Single or Double-action.

Class G, Gravity Presses, Drops—With Hand, Foot, Crank, Belt or Roller-Lifter.

Class P, Punching and shearing Presses—Power, Throated.

Class S, Stamping and Bending Presses—Power, Double-crank, Composite-frame, Throated or Straight, Upright or Inclined, Rectangular or Round Beds.

Non-geared presses are commercially named with their "type-word" "Press," followed by their "symbol," consisting of their "class-letter" prefixed to a "size-number," as "Press C1," "Press D3," etc. All geared presses have a "gear-letter," "G," after "class-letter." Thus, "Press P5," when gearing is added, becomes "Press PG5," and the "symbol-plate" attached to frame of press is changed accordingly. Should the same press be double geared it then becomes PGG5."

The above symbolizing was originally commercial only, but it has been arranged for the same symbols to be used for all manufacturing inscriptions. If but one kind of article, such as presses, were made in the factory the symbols D75, SG5, etc., would be sufficient to absolutely identify each machine from every other. If, however, millers or lathes were also made in the factory or were likely to be at some future time, then it might be desirable, logically, to use some symbol that had already been used for presses. In such case the prefix "press," or its initial "P," would be necessary in the one case, and the word lathe, or its initial L, in the other case. The symbols mentioned might therefore read PD75 or PSG5, the first letter standing in these cases for the commercial word.

Thus it will be seen that the symbolizing of a machine or other article may prove a very elastic affair, either letters or figures, being used in any way desired, care being taken to make them as few as possible and to keep them systematic, so they will suggestively refer to the general type of article in question, and to its particular class, and to its size. Where

numbers are used they should be liberally "gapped" to allow for future intermediate sizes being interpolated. If desired, these symbols may be arranged in a purely arbitrary fashion, but this is not advisable. Since the former essays were published it has been found desirable to give more latitude in the number and kind of characters in a symbol, with a view to greater elasticity, and more adaptability to the various purposes before referred to.

Piece Names.

Regarding *piece names:* much ingenuity is necessary to get them short, logical and suggestive. If a machine is simple the most important piece can usually be called "frame." If it has but one shaft and one wheel these can be named simply by the noun representing them. Should there be more than two shafts, adjectives are necessary, as "main-shaft," "second-shaft," "third-shaft"; or, "upper-shaft," "middle-shaft," "lower-shaft"; or, "lower-right-shaft," "lower-left-shaft," etc. These adjectives, it will be seen, are based upon relative importance, or geographical position, in the machine. They sometimes can be derived from constructional features, as "crank-shaft," "cam-shaft," "gear-shaft." In other cases these descriptive words can be functional, as "driving-shaft," "feeding (or feeder) shaft," etc.

As suggested above, we have but two or three words to describe a piece; there are many cases, however, where four or more are necessary, as for instance where two different shafts have each a cam, or a collar, or some other attachment; and this attachment, in its turn, has a key or some other sub-attachment. We might, therefore, have "upper-shaft-cam" and "upper-shaft-cam-key." In any case, these component words of a name should be hyphened together to form a compound word, and the quantity of simple words used therein should be kept to a minimum, as far as possible.

No general rule can be given except to follow some general principle throughout any one machine or article, or a series of the same, whose pieces are to be named. Evidently, the names should be descriptive of functions, as far as possible, as an aid in assembling in the shop, and in ordering duplicate parts for repairs by a customer. When, however, the words in a piece name get too numerous, some of them should be dropped off, even at the expense of logic and uniformity. As a matter of good practice they should be kept within the limits of four or five words, even if a somewhat arbitrary name has to be adopted.

Piece Symbols.

In arranging *piece symbols*, it is best to use numbers entirely, although the system would work properly in any particular case were letters chosen, as indeed they may be in cases where the total number of pieces of each one of all the products of a factory falls well within the limits of the alphabet. In choosing piece numbers it is best to begin with the most important parts of the machine, as the frame or its components, followed by pieces which are attached permanently to it, etc. Then may follow the next most important group, perhaps a principal moving member, with the parts attached thereto. In some cases it is better to classify the groups in this way, ending with the most trivial pieces, while in other cases it may be better to take first all the pieces on which the prevailing machine-work is done by the planer and next by the boring tools, followed by the lathe-work, etc. Another general idea to be had in mind, in classifying into these groups, is the kind of material. It is, however, impossible to be strictly logical, as there is such a variation in the different articles dealt with. One point we should keep in view is to allow plenty of numbers for each group as, for instance, from 1 to 10 for the frame and other heavy parts which are very likely to be mostly planer work; then from 11 to 20 can be allowed for the next group, from 21 to 30 for the next, etc. If any group has in it more than 6 or 7 pieces it is best to take 20 or even 30 rather than 10 as the unit for the group. The idea of this is to allow gaps in the numbers, so that additional pieces which may be added to the machine later on may have their numbers located in their proper places in reference to other similar ones, instead of being thrown into some high number, beyond all their brethren in a group.

If no piece needed changing in the slightest degree as time developed the identification of each piece would be complete by giving the article symbol, then the piece symbol, with a hyphen between them, as PSG5-21, which might perhaps represent the fly-wheel of a press SG5, P standing for Press. As, however, alterations may probably be necessary on any piece (and nobody knows which), it is essential that its individuality be retained in any form it may assume. Hence its "style" may be designated by a letter, which becomes historical after a first change. As originally made it is style a, after the first alteration style b, after the second style c, etc., it being preferable perhaps to use small letters for the style, as being unimportant for current use. Capital letters may be used, however, if desired. Thus, if the fly-wheel above mentioned had been altered twice and was indulging in its third *style*, the symbol would be PSG5-21c.

Although in some cases slight and inconspicuous changes in design may be allowed in an article without changing its symbol, it still remaining practically the same in the eyes of customers, yet a very rigid rule should be applied to all piece symbols in regard to the number and style thereof. This will allow absolute identification both within the factory and without. So much for the symbols necessary to positively identify an article and all its pieces, both in the market commercially, and in the shop and accounting department mechanically and financially. Were no special tools used these symbols would be sufficient.

Operation Symbols.

Another useful symbol which may follow the two preceding ones, separated from them by another hyphen, represents the *operations* in manufacturing. These should be designated by the numbers 1, 2, 3, etc., and should be arranged in groups of 10 or 20, with plenty of gaps for possible future operations, each group representing work on one piece. It is well to leave the first ten numbers for such operations as buying material freighting to the factory, casting, painting, cleaning, etc., commencing the regular machine operations at 11. It may not be quite conventional to call buying an operation, but it is strictly logical and is useful in cost-accounting, that all operations may be treated alike and added into the total. The price paid is, of course, counted as the cost of the operation.

An *operation* in machine work may be defined as such work upon a piece as can be done by one person (having, if the work is heavy, such assistants as he requires) at one time—that is, before laying the piece down and taking up another one. Thus each operation is treated as a definite component of value, in piece-work and cost-accounting in general. An operation is not necessarily always one kind of work upon a piece, but this depends upon the tool. Drilling a certain hole might be an operation of itself if done with a single drill; while if done on a gang-drilling machine the drilling of several holes of different sizes, or tapping, or counter-sinking, etc., might be done before the piece was laid down. This is often the case in manufacturing sewing-machines and other small articles. On the other hand, drilling a hole might become two operations, if it was found best to deepen it in a separate machine from the one which drilled it part way down. As an example of our growing symbolism, the *turning* of the fly-wheel above mentioned might be PSG5-21c-11.

Tool Symbols.

A fourth inscription, known as a *tool symbol*, separated from the preceding ones mentioned by still another hyphen, may represent a special tool used upon a given operation. This is simply the letter A for the first tool used, B for the second, etc. Thus the piece under treatment, having been turned under operation 11, might be placed in a jig for a drilling operation 13, this jig being marked A. If a bushing or some other attachment to the jig were required it would also be marked A, as would all the loose pieces of a given tool. A second tool, as a special drill which afterwards was brought into action, might be marked B, etc., etc. For the fly-wheel in question this drill would be PSG5-21c-13-B.

The special tool itself, whether it be a working drawing, a pattern, or a machine-shop tool, such as a jig, cradle or gauge, is thus marked with the whole string of symbols belonging to the article, the piece and the operation, followed by its own particular symbol letter. A special reamer for the fly-wheel before mentioned might follow the boring tool in turning and be symbolized as PSG5-21c-12-A, it being the first tool of the

second machine operation, the first operation being turning. This is assuming that the wheel was reamed separately from the lathe work upon it.

There are not likely to be more than 26 tools in one operation in ordinary work; should there be, the letters may be doubled—or Greek letters may be used, should the *personnel* of the factory be classically-minded.

If a certain piece will answer for two different machines of different sizes or kinds it may be known by the name of both as regards the article symbol, preferably being called after the article for which it was given birth and for which it is most generally used. If a tool will do for two or more pieces or two or more operations on the same piece, or both, it should be marked with all the symbols of pieces or operations for which it is used in common. Where two or more piece symbols, or operation symbols, appear they should be placed over one another rather than following in a line. The order of sequence of the various kinds of symbols in a horizontal line, as has been described, is needed to identify them.

The Making of Symbols.

In the use of symbols it is desirable to mark the article itself, upon its frame or some other important piece, prefixing it with a noun representing a brief commercial name of the article. As desired, this may be done with the customary cast inscription, in cameo, or by stamping. If a separate name-plate is used, it should be riveted rather than screwed on, as otherwise it is too easy to remove these identifying characters. In some articles, as stoves, agricultural machines, etc., it is sometimes customary to cast the number, or what is here called the piece symbol, upon each piece, but this is oftentimes too expensive and troublesome.

The article symbol should be marked upon all main drawings, and the piece symbol upon each piece on detail drawings. If the pieces themselves are to be stamped, or otherwise marked, the locations of such marking should be shown upon the drawing of proper size. Where practicable, the piece symbol should be marked on all the pieces exposed to view on the various main drawings, which is best done with blue ink, diagonally, that the symbol may be distinguished from the black letters of the drawing and the red-ink dimension figures both by color and general position. All foundry patterns should be marked with the article symbol followed by the piece symbol; and, preferably, the name of the manufacturer should precede the symbols, thus identifying the pattern in all respects when sent to outside foundries, etc. If desired, the pattern may also contain the tool symbol, belonging to it as a tool. The latter method is logical, but not always necessary. It is of practical use, however, where metallic patterns may be mistaken for castings made from them. Where a pattern is made of several pieces the symbol should appear upon each. While speaking of patterns the advice is here strongly given to allow all joints where different parts connect to appear of the natural wood color, varnished, while all parts which represent the outside surfaces of the casting should be black or some other dark color. Core-prints are very distinct if of bright red, as are the insides of the core-boxes and the division surfaces of the pattern wherever the cores would appear.

Other special tools, as jigs, special boring tools, gauges, etc., should have all the symbols upon them as before mentioned. It is well to also have the name or initials of the factory, but as such tools are usually kept at home, in definite drawers or bins, it is not so necessary as if they were used outside. On large jigs, etc., the marking may be in large painted characters, as well as in smaller stamped ones. Where tools are already hardened the marking may be etched. It is desirable to paint jigs and other special tools a distinctive color, the writer having found vermilion shellac varnish very useful. This is because it dries almost instantly and can be cheaply renewed. Such jigs are very conspicuous, and can easily be found when lying around a shop. Such easy identification is very desirable where they happen to resemble other castings for which they might be mistaken—as is the case, especially, where "models" are used for the workmen to look at.

Suitable index-books should, of course, be kept, ruled with proper columns for all the different full-names, symbols, weights, quantity of similar pieces composing the article to be built, etc., etc.

In general, this system, as here briefly described, is much the same in principle as in the former papers mentioned, but some amplifications have been made and much more elasticity has been given to it by allowing full freedom in the arranging of article symbols, etc. The "strings" of symbols shown many seem cumbrous, but in what simpler way can a hundred-thousand or so of pieces and tools, to say nothing of operations, be absolutely identified, throughout all the changes of years, with a name for each thing and one name only?

A PRETENTIOUS COMBINATION TOOL.

A combination tool has been designed by W. Glover & Sons of Warwick, Eng., and is illustrated in a recent issue of the *Motor Car Journal*. The device is said to have a considerable range for emergency work, and will run the average blacksmith shop a close race on tool equipment. The especial field of work for which the tool has been arranged is in emergency repairs on automobiles at the roadside. The illustration presents the tool as a jack in Fig. 1, a drill in Fig. 2 and a vise in Fig. 3 (the description says "vice," but this is perhaps not more than half true).

The machine consists of a yoke casting to which are hinged two long jaws, a large screw bored out from end to end and fitted with a central spindle, and a ball bearing to take the end thrust on the large screw. In the ordinary form, as illustrated in Fig. 1, the combination constitutes a lifting jack capable of raising two tons, and by turning up the feet and putting the screw at right angles to the former position, the tool becomes a vise which can be clamped to some convenient support by the roadside, or even on the vehicle itself. Fig. 2 shows a position

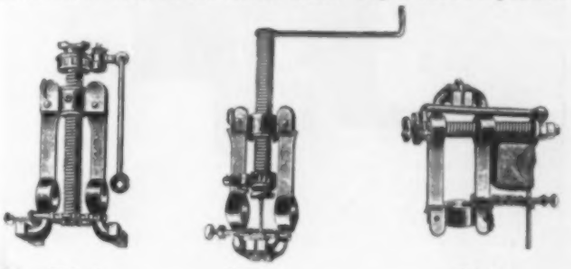


FIG. 1. FIG. 2. FIG. 3.

A COMBINATION TOOL.

of the device which combines the vise and drilling machine, but this degree of flexibility is strictly limited, as there appears to be no possibility of going any further than this stage in the tool combination with the present design. Should the machine get to this side of the Atlantic, however, and find favor we may expect to see it equipped with belt pulley or flexible shaft to the engine of the motor vehicle, so that the touring chauffeur would thereby come a step nearer to independence of the country machine shop.

The Closed Top for Blast Furnaces.

Julian Kennedy, iron and steel works engineer, Pittsburg, has in operation at the present time ten of the Julian Kennedy closed furnace tops and eight additional tops are now being installed. Those in operation at the present time are at the following blast furnaces: Iroquois Iron Co., South Chicago, Ill.; Isabella Furnace, Carnegie Steel Co., Pittsburg; Woodstock Iron Works, Anniston, Ala.; Clairton Steel Co., Clairton, Pa., two; Toledo Furnace Co., Toledo, O.; Rochester & Pittsburg Coal & Iron Co., DuBois, Pa.; South Chicago Furnace Co., South Chicago, Ill.; Cleveland Furnace Co., Cleveland, O. Tops are now being installed at the following plants: Clairton Steel Co., Clairton, Pa.; Illinois Steel Co., Joliet, Ill.; Punxsutawney Iron Co., Punxsutawney, Pa.; Buffalo & Susquehanna Iron & Steel Co., Buffalo, N. Y., two; Cambria Steel Co., Johnstown, Pa.; American Steel & Wire Co., Cleveland, two. A number of these tops are also to be installed in plants in England and Germany.

The recent fire in the plant of the Murray Iron Works, Burlington, Ia., was a little blaze that did not stop for an hour the operation of the shop in which it occurred. This company has plants in three separate towns.

THE ROCHESTER DIE SHAPER.

The illustrations present a device which practically converts a milling machine into a vertical shaper, or, as it is usually termed, a slotting machine. The attachment is especially serviceable in working out dies for punching presses, cutting special gears, internal or otherwise, ratchets of various forms, keyways, box tools, etc., where the workman follows either

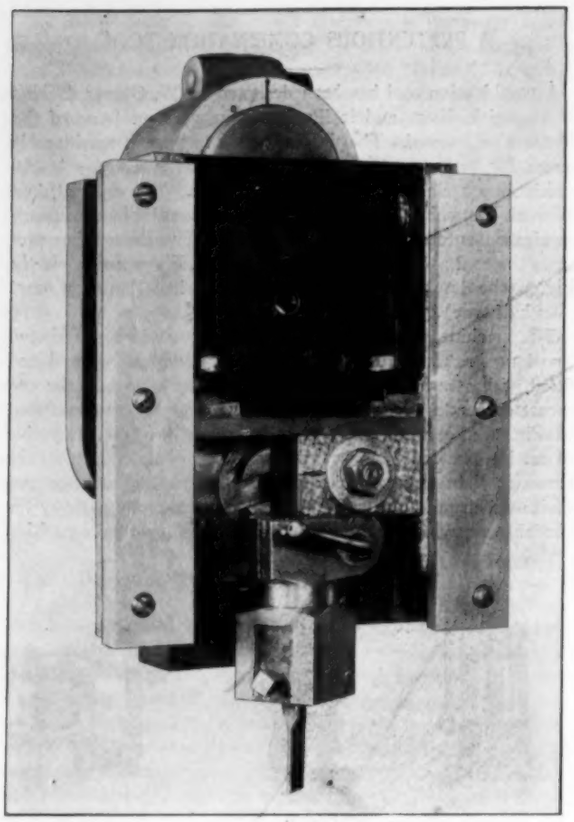


FIG. 1.—THE DIE SHAPER COMPLETE.

regular or irregular lines not readily reached by other means.

As is shown in the halftones, the attachment can be employed upon any milling machine of the standard type, and when once fitted in place may be conveniently slipped on or off as occasion requires. The device clamps on to the overhanging arm of the milling machine and is further supported and steadied by a brace which grips the ways of the column. Fig. 1 shows the attachment complete and Fig. 2 illustrates the details of the device. A sleeve in the center of the attachment is driven by a taper shank which has one end fitting the socket in the milling machine spindle. The other end fits into a sleeve of the attachment, which operates a horizontal sliding block which works in the cross slot of a vertical slide. A vertical stroke from zero up to 3 inches, as may be desired, is obtained by adjusting the clamp bolt in the slot of the sleeve. A clapper block has been provided with a mechanically operated locking device. This locks the tool securely on the down-stroke and gives perfect clearance for the cutter on the up stroke.

The toolholder is separate from the vertical slide and can be rotated and clamped in any desired position, as might be required for example in working around the cutting edge of a trimming die. Fig. 3 shows a job of this type where the tool is cutting out work which is held upon a tilting chuck providing the necessary clearance angle for die work.

The terms horizontal and vertical have been applied to certain parts of the tool, as shown in Fig. 1, but these are only relative to that position of the attachment. The device can be swiveled in a vertical plane through 360 degrees, and is thus available for a wide range of work. Fig. 4 illustrates the tool working at an angle of 90 degrees from the other positions. The attachment is made by the Rochester Die Shaper Co., of Rochester, N. Y., and has been entirely redesigned from its initial appearance a year or two ago, having now greater flexibility than ever.

Youngstown Iron Sheet & Tube Co.

After having plans prepared and contracts for the erection of buildings awarded, the Youngstown Iron Sheet & Tube Co., Youngstown, O., has decided not to go ahead with the erection of its open-hearth plant and blooming mill. Whether in the future, when the question of erecting a steel plant is again taken up by the officials, an open-hearth plant will be decided upon is in doubt, as the erection of a Bessemer plant is strongly favored. The open-hearth was to have contained six 50-ton furnaces with a daily output of 600 tons. Provision was made for an open-hearth building 525 feet long and 140 feet wide. On the casting side an electric crane with a capacity of 100 tons was provided for, on a 60-foot runway. Other features of the plans were as follows: On the steel charging floor an electric charging machine and a runway for a hot metal crane of 40 tons capacity and a span of 70 feet. Stripper building 30x45 feet, with two runways for electric strippers. Pit furnace building with a main span of 76 feet and 200 feet long. A lean-to 18 feet wide, with floor for supporting the valve rigging. Crane runway for electric charging crane, 72 feet wide. Blooming mill building 56x420 feet, with runway for a 40-ton electric crane. Engine room building 55x160 feet, with runway for a 20-ton electric crane. Stockhouse 80x300 feet, with runway for a 10-ton electric crane.

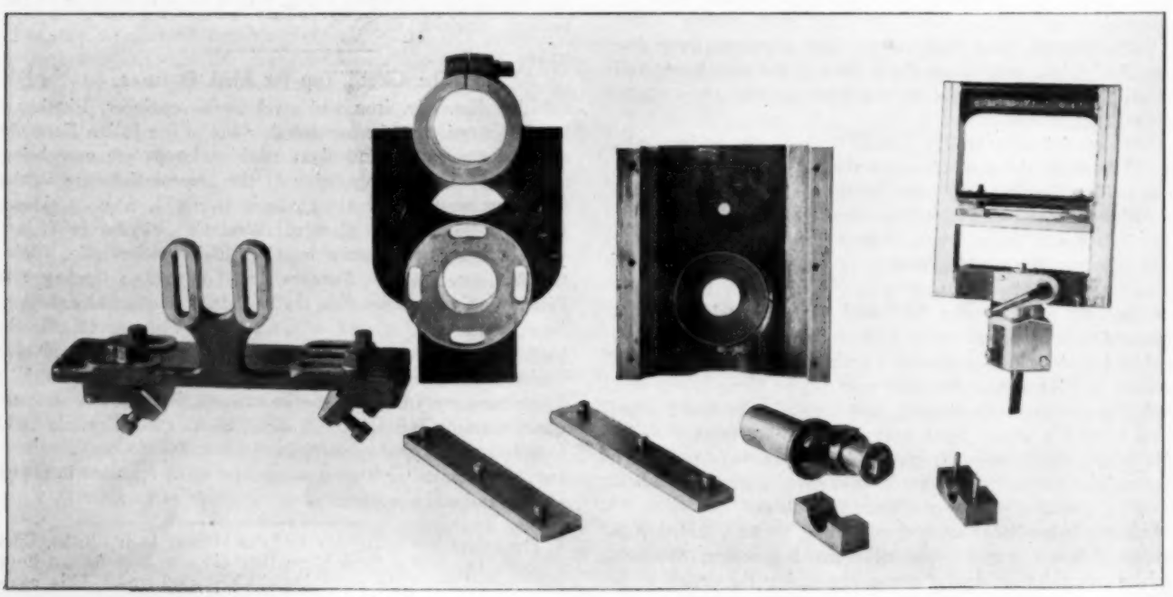


FIG. 2.—DETAILS OF DIE SHAPER.

WAYS AND MEANS IN ADVERTISING.

BY JOHN DRUMMOND.

Some months ago I contributed to the columns of *The Iron Trade Review* an article on the advertising of machinery. The subject is by no means exhausted and is of such importance that a few more comments may be worth the while. The amount of money paid out in advertising is sufficiently large to warrant critical consideration, and the subject cannot be barred from public discussion any more than the details and

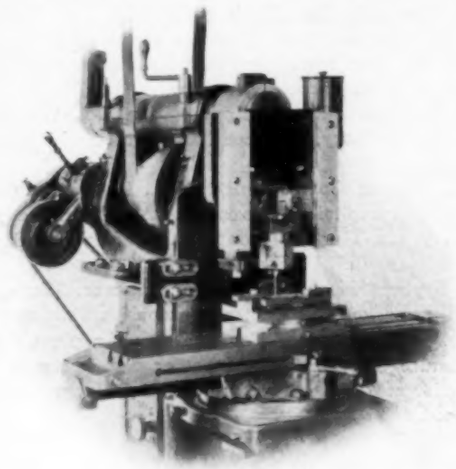


FIG. 3.—CUTTING OUT TRIMMING DIE.

efficiency of a new feed motion or charging machine.

Advertising does not mean simply so many square inches of space in a technical journal but includes circulars and catalogues; printed postal cards, large and small, return and single-trip; souvenirs, puzzles, calendars and chromos of divers hues, forms and prices. There is something to be said for all of these and every manager will have an opinion about their efficiency that neither I nor anyone else can change.

A man who manages a plant quite successfully, has assured me in all seriousness that he has had better returns from a lot of postal cards than his trade paper advertising had secured. He has spent some money, I think I may safely say much money, on the ownership of space in mechanical magazines. His opinion is not that of a tyro but is given as from one who knows whereof he avers.

How comes this conviction and is it well grounded? So far as some inquiry can elicit the facts, I find the situation summed up as follows: From the time he placed his advertising contract for so many inches, he did little more than send on a circular or two, a catalogue, occasionally an electrotype, an assurance now and again that "our left-handed tap wrench is the best ever" or words to that purport and ever and anon affixed his O. K. to recurring proofs. Please note that the fellow at the other end could only rearrange the facts sent in and in this respect the ads would be no better than the catalogue and circulars. The circulation of the paper must do the rest.

But what of the postal cards prepared when he wanted to do something? Did he turn the matter over to another man and wash his hands of the job? Not much. He had a thing or two to say and he said it. He looked over his letters where he had been up close to prospective customers and yet was not "next" to a sale. Out of the arguments advanced he could select a few to carve congealed moisture and in a plain businesslike manner make clear the good his machines could do in the other fellow's shop. This is the way he manufactured ammunition.

Of course the task takes more than this to make it a success. Must not lie down at that stage. Well, hardly. The trade papers (and his card index prepared from that source) yield a supply of names of promising new enterprises, old plants extending, progressive managers anxious to acquire manufacturing means and by sale, barter or scrap heap methods, refresh the shop equipment. A list of names of that sort with the ammunition I have described is not a bad start for a winning combination. A trick ought to be turned that way surely and so I told my friend.

Granted the same amount of interest, and real live business grip of the situation, he could have done even better with his advertising in the first place. He did not try to keep his finger on the publication pulse and was not in touch with the game. A player who hands his cards to his neighbor was not less in it. Give the man who sells your goods every facility for doing the work—and the manager who fails to recognize a salesman in his ad has a poor ad maybe, but misses his guess anyway.

Then there is the matter of reaching the right address. The list of aggressive manufacturers is nothing more than that included in the constituency of a paper put into the hands of buyers. Not everyone agrees about this class, however. I read that one manufacturer finds the best way he can select good mediums for his advertising is to take notice of what the workmen like in printed matter. The scheme is simple enough. Put a few periodicals of a mechanical stripe out where the men can get at them noontime. Note the wear and tear on the pages. Few if any things are easier. Why not carry the idea a step further?

Suppose we propose to enlarge the power plant. We look over the advertising pages of the different journals carrying the names of builders of such equipment. Shortly we are in receipt of circulars, catalogues and the like from manufacturers anxious to show us "what's what." How shall we make a choice? Do we take the batch of trade literature and place it out where the employes can enjoy it as a relish at or after lunch? Is the salesman invited to meet the employes and argue the matter with them in general?

On the contrary we no more submit the task of selection to majority vote than we ask for arbitration in fixing rates of wages. The whole thing is no more a majority affair than the amount of sugar you drop into your cup of coffee. Managers who cannot purchase without reference to the opinions of the mass of their workmen and who give abject obedience thereto are in the minority. They are about as numerous as the proprietors who ask for a vote on a particular brand of lubricating oil. One reason why the average manager holds his position is the fact that he is credited with the "know how," or if he does not know, can acquire the information at short notice. That he knows less than the majority under his charge is scarcely borne out by the facts.

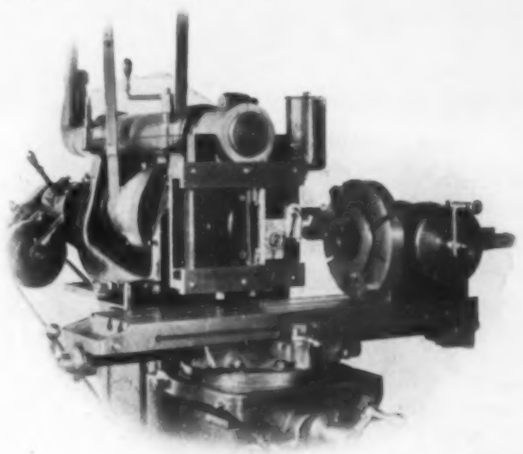


FIG. 4.—GEAR PLANING.

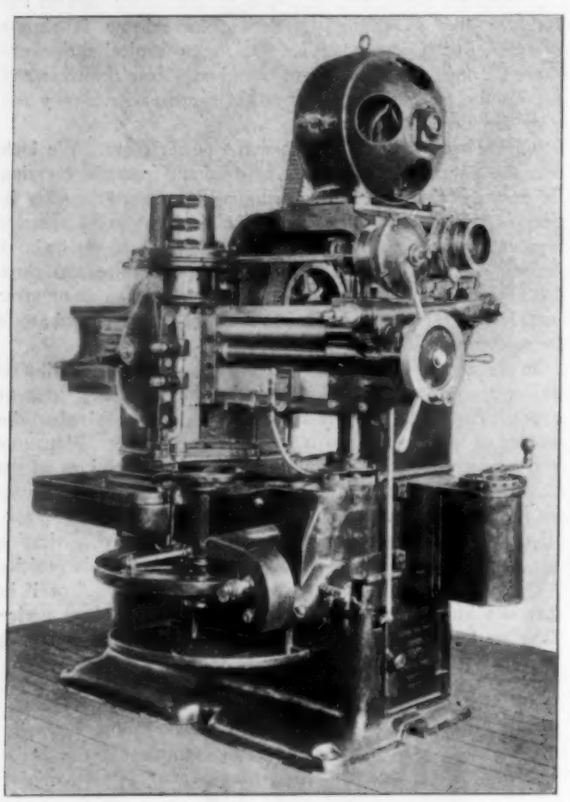
Herein was the potency of the postal card bid for business. Every man was a possible and probable purchaser. Concentration on customers was the plan, and no frittering of time on those who had no purchasing power. There is a place for all things, and I am not inclined to limit the value of any well-conducted publication, no matter what its clientage. But in the cool light of analysis I believe that the paper which is read by the minority who buy is by far the best selection for service by the man in pursuit of business.

MOTOR-DRIVEN GEAR SHAPER.

A motor-driven gear shaper built by the Fellows Gear Shaper Co., of Springfield, Vt., is shown in the halftone. This machine is one of several gear shapers so equipped and the one selected for illustration is now running at the Crocker-Wheeler plant at Ampere, N. J.

Being on top of the machine, the motor is entirely out of the way and is not likely to be injured by the chips, grit or dirt which may be dropped on the floor. There is a silent chain drive from the armature shaft to the machine, and the arrangement is a very compact and effective one.

The gear shaper itself is now a familiar object in machine shops and has been thoroughly described in the past. In general design there has been little change though a number of minor details have been affected and such changes and improvements are largely in the direction of increasing the strength of the machine as experience has suggested and



MOTOR-DRIVEN GEAR SHAPER.

for further convenience in manufacturing—a combination of improvements making for the advantage of builder and user.

National Machine Tool Builders' Association.

The next meeting of the National Machine Tool Builders' Association will be held in New York City, Tuesday and Wednesday, Nov. 10 and 11, with the Hoffman House as headquarters. Indications are that a large representation of the concerns in the association will be in attendance. A program is in preparation that will permit of prompt dispatch of the business in hand, and the session promises to be one of the most important and resultful yet held. Joseph Flather, of Nashua, N. H., is president; Wm. Lodge, of Cincinnati, and W. P. Davis, of Rochester, N. Y., vice presidents; P. E. Montanus, Springfield, O., secretary; and Enoch Earle, of Worcester, Mass., treasurer.

Frank Seither, managing owner of the steamers G. J. Grammer and V. H. Ketchum, has closed a contract with the Great Lakes Engineering Co., of Detroit, for a 5,000-ton steamer. The new boat will be 376 feet overall, 356 feet keel, 50 feet beam and 28 feet deep. The plant of the Great Lakes Engineering Co., which is located in the lower part of the Detroit river, is not completed and it will be several weeks before the keel for the new boat can be laid.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The Federal Bolt & Rivet Co., Washington, D. C., has been incorporated with a capital stock of $1,000,000. The incorporators are: Edwin E. Crook, Robert M. Nelson, John L. Dement, P. J. Kennedy and C. D. Wright.

The Comstock Sash Lock & Novelty Co., Ypsilanti, Mich., has been incorporated with a capital of $200,000. A building has been rented in which the company will manufacture all sorts of metal novelties.

The Woodward Rotary Engine Mfg. Co., Woodward, Oklahoma Territory, has been incorporated with a capital of $50,000.

H. C. Doman Co., Oshkosh, Wis., has been incorporated with a capital of $50,000, to manufacture engines, machinery, etc. The incorporators are: Edgar P. Sawyer, H. C. Doman, Phil H. Sawyer.

The Syphers Machinery Co., of Spokane, Wash., will be in the market this winter for considerable new machinery. The company is now erecting a plant for the manufacture of special machines for use in cereal mills, saw mills, etc. The woodworking machinery has been purchased.

The Landis Tool Co., of Waynesboro, Pa., is being organized to manufacture a patent bolt cutting machine, an invention of A. B. Landis. The authorized capital will be $50,000, of which $30,000 has been paid up.

Salem Iron Works, Winston-Salem, N. C., are in market for cupola, ladles, overhead traveling crane, blower, etc., of suitable capacity for foundry adapted for handling heavy castings of 10 to 15 tons; new preferred, but second-hand will be considered.

McIver & Mackay, Ocala, Fla., want a couple of good second-hand single-drum double-cylinder friction hoisting engines, 10 to 12 horsepower.

Saxony mills, 312 Lombard St., St. Louis, Mo., is in market for 10-horsepower gasoline engine and two new boilers for steam plant to be of a capacity of about 450 horsepower together, say 225 horsepower each.

Clark C Hines, agents, 809 Equitable Building, Baltimore, Md., are in the market for 12 to 18-ton standard gauge locomotive, 75-h. p. portable boiler and a 150-h. p. boiler or two 75-h. p. locomotive vertical or Scott's boilers.

E. J. Codd Co., 700 S. Caroline St., Baltimore, Md., wants to purchase a lathe to swing 50 inches by 10 feet between centers, or larger.

Sayre Bros., proprietors of the Peninsular Foundry Co., Newport News., Va., are in market for two 5-ton jib cranes, 16-foot post, 18 to 20-foot reach; one No. 3 Baker or Root blower in exchange for No. 4 Root; one 32-foot span hand-power traveling crane, 5 tons capacity; one wood-turning lathe, one radial drill, 30 to 48-inch arm; one hand saw.

The Driskill Posthole Auger Co. has been incorporated, with capital of $30,000, at Paducah, Ky., for manufacture of patent posthole auger, by J. B. Driskill, J. H. Sullivan, Samuel G. Givens and Geo. W. Oliver.

The Ohio Machinery Co., Cincinnati, has been incorporated with a capital of $5,000. The incorporators are: J. A. Trautman, J. J. Armstrong, Geo. E. Palmer, Jr., Jas. C. Butler and W. J. Maby.

The Phelps Gasoline Engine & Machine Works, Phelps, N. Y., has been incorporated with a capital of $11,000. The incorporators are: Wm. C. Edmonston, Edwin S. Corwin and Wm. A. Howe.

The Staw & Patchell Machine & Foundry Co., Charleston, W. Va., has been incorporated with a capital of $25,000. The incorporators are: D. H. Patchell, H. S. Staw, Moses W. Donnaly, Ham Morris, Jr., L. W. Couch, Charleston, W. Va.

The Manufacturers' Foundry Co., of Waterbury, Conn., has increased its capital stock from $10,000 to $50,000.

The Zeidler Lamp & Brass Co., Fond du Lac, Wis., has

been incorporated with a capital of $12,000, to manufacture brass and iron novelties.

The Lea-Pangborn Mfg. Co., Chicago, has been incorporated with a capital of $10,000, to manufacture welding iron and steel.

A number of Toledo capitalists, including John Craig, Thos. Watson and others, are organizing a steel castings company with a capital of $100,000. A site of 12 acres has been purchased on the Terminal Belt Line.

Fires and Accidents:—

H. V. Finklestein's machinery warehouse at Peoria, Ill., was burned Sept. 19, with a loss of $100,000. Two men were badly burned.

Fire destroyed a section of the Elliot Frog & Switch Works, East St. Louis, on the night of Sept. 17. Loss will amount to about $8,000.

Fire on the morning of Sept. 22 destroyed the foundry of C. H. Hopke, of Rockford, Ill. Loss, $10,000.

The frame foundry building of the Moline Scale Co., Moline, Ill., was destroyed by fire Sept. 17, causing a loss of about $6,000. Patterns for the jobbing work had fortunately been removed the day before. It is expected that the building will be reconstructed.

Fire originating from an unknown cause in the blacksmith shop did $7,000 damage to the plant of the M. F. Williams Mfg. Co., St. Louis, Mo. The company manufactures mining machinery.

The Santa Fe locomotive shops in Albuquerque, N. M., were badly damaged by fire on the night of Sept. 19.

The steel pipe works of Francis Smith & Co., San Francisco, Cal., were destroyed by fire Sept. 17. Loss $60,000.

The shops of the Wickham & Chapman Piano Plate Co., Springfield, O., covering 8 acres, were totally destroyed by fire Sept. 26, causing a loss of between $100,000 and $150,000, with but $50,000 insurance. Four hundred men are out of employment. The fire originated in the japanning rooms, where there was an explosion of oils. The company had an output of 250 piano plates daily.

The boiling over of a pot of pitch in Booz Bros.' shipyard, Baltimore, Sept. 23, started a fire which completely destroyed the rear of McIntyre & Henderson's machine shop adjoining, and did considerable damage to the buildings occupied by Booz Bros. The damage is estimated at about $15,000, which was covered by insurance.

The Ferracute Machine Co.'s plant at Bridgeton, N. J., for the manufacture of presses and dies, was destroyed by fire Sept. 27. An explosion in the boiler room is the reported cause. The loss is put at $100,000; partly insured.

At Saginaw, Mich., two warehouses and the machine shops of L. Clinkofstine were burned. Loss $10,000.

New Construction:—

When the Allentown Foundry & Machine Works, Allentown, Pa., complete the erection of the new machine shop, which is 80x200 feet, a large addition will be built to the foundry. The company will soon be in the market for lathes, planers, gear cutters, drill presses, grinding machines, turret lathes, and all kinds of machinery pertaining to machine shop work.

Plans have been completed for a new plant for the Pickering Governor Co., at Portland, Conn. It comprises brass and iron foundries, and the main building is to be 220x50 feet, with three wings, each 35x100 feet; heavy mill construction.

Iron work for the new shops of the Rio Grande Railroad at Salt Lake City, Utah, will soon be ordered. The plans and specifications are ready with the exception of some minor changes. They call for an outlay of not less than $255,000. The shops will be modern in every respect, and the finest machinery will be installed. Electricity and compressed air will be the motive power for operating the machine and boiler shops. Several cranes for lifting locomotives will be installed.

Work was begun Sept. 17 on the brick construction for the new Southern Pacific railroad shops at Salt Lake City.

The Pennsylvania Railroad is planning for new repair shops at West Fairview, Pa., which will cost $500,000. The work will include the erection of a smith shop, 55x50 feet; a material building, 522x60 feet; a storeroom, 237x60 feet; a men's room, 116x60 feet; a lavatory, 69x60 feet; a planing room, 40x60 feet; a machine shop, 80x60 feet; a fan house, 60x45 feet; an office, 140x50 feet; a bunk house, 100x40 feet; and an oil house, 25x50 feet.

A contract has been let to Edward Brady & Co., of Baltimore, by the Baltimore & Ohio Railroad for still further increasing the capacity of the Mount Clare shops. The cost of the building will be about $85,000, and nearly $100,000 worth of machine tools has been purchased.

The New York Central's new erecting shop, largest of the group at West Albany, N. Y., has been nearly completed. The structure is 90 feet wide and 400 feet long and 48 feet high, of steel and brick, and cost $160,000. Two cranes for lifting locomotives have been installed.

The Richland Foundry Co., Belleville, Ill., will erect a foundry, consisting of two buildings, one 60x150 feet and the other 30x80 feet, at a cost of $10,000.

The Salem Iron Works, Salem, N. C., is preparing to erect another foundry especially adapted for handling heavy castings of 10 to 15 tons.

At a recent meeting of the Chamber of Commerce, Tacoma, Wash., it was decided to go ahead with the building of new shops for the Pacific Car Works. A committee, to solicit stock subscriptions, of which over $21,000 has been subscribed, was appointed.

The Ft. Wayne Electric Co. is erecting an addition 50x86, brick, to be used exclusively for offices in addition to its present office space. It is also building another two-story addition 50x85 which will be used as a pattern shop, japanning and dipping room.

The Emery Wheel Co., of Tiffin, O., is erecting a two-story brick addition, 60x40, at the front of the present plant, the upper story of which will be used for offices, while the lower part, as well as the space now occupied by the offices, will give additional shop room. In addition to this the company is also erecting a one-story brick, 95x35. It contemplates building a foundry later.

Flum Bros. have completed the erection of their new foundry plant at Hamilton, O. The main molding floor is 60x108 feet.

The Illinois Steel Co. will erect a structure in connection with its plant at Indiana Harbor, Ind., which is to serve the double purpose of office building and club house for the officials stationed at the works. The plant will be two stories, 42x72 feet, and will be elaborately finished in various kinds of hard wood. It will cost $35,000.

A. Zalondek is erecting a two-story building at Oklahoma City, Okla., at a cost of $15,000, to be used as a machine works.

The Dover Forge & Iron Co., Canal Dover, O., is completing the construction of its new works as rapidly as possible and expects to have them in operation by Jan. 1. The output will be hammered iron products, consisting of charcoal iron slabs, blooms and billets, charcoal tin bars, hammered puddled iron blooms and billets, puddled iron sheet bars and muck bar.

Improvements recently made in the Anderson, Ind., plant of the American Steel & Wire Co. cost $150,000. Pending the completion of the improvements, the company is now shipping rods by freight from the Cleveland plant to the mills at Anderson, to meet the urgent demand for wire and nails.

The Eleanor Iron & Steel Co., formerly of Irwin, Pa., has secured a site at East Butler, Pa., and is erecting two 40-ton open-hearth furnaces, 30-inch blooming mill and sheet bar mill.

The Winona Carriage Co., Winona, Minn., has purchased a 10-acre site, upon which there are a number of buildings which the company will use, and will also erect an additional building, 62x200 feet, three stories, which will be equipped with modern machinery, operated by in-

dependent motors. Considerable new machinery will be required.

Work has begun on the construction of the shops for the Canadian Northern Railway in Winnipeg, by Smith & Sharpe, the contractors. The round house will contain 42 engine stalls. The machine shop will be 300x100 feet; the blacksmith shop, 80x70 feet; the freight car repair shed 220x120 feet; store buildings for mechanical department, 300x50 feet; a large repair shop, 120x25 feet; foundry, 100x60 feet, and there will by several small buildings. All will be of fireproof construction.

The Navy Department has advertised for bids for the construction of a foundry at the Puget Sound Navy Yard. Bids will be opened Oct. 10. The appropriation for the foundry is $10,000.

The Simplex Co., Hammond, Ind., has begun work on the addition to its plant, which is to be 180x300 feet, to be used for the manufacture of car springs.

Reed Twentieth Century Engine & Machine Co., in which John A. Reed, of Gulfport, and A. J. Davis, of Jackson, Miss., are interested, will establish plant at Gulfport, Miss., for the manufacture of engines. John H. Lang is secretary.

The Chattanooga Electric Railway Co. is considering plans for extensive enlargements of its shops and car barn at Chattanooga, Tenn.

The Guenther-Wright Machine Co. will erect new building at Owensboro, Ky., for its plant at cost of $10,000.

The buildings of the Locomotive & Machine Co., Montreal, Que., are now nearly finished. The locomotive department has been busy all summer in a temporary shop rebuilding locomotives and making parts for new ones. The structural department is to be fitted to build steel buildings, roof trusses, turntables and bridges. The machine shop is 420x132 feet. The walls of this building as well as all outside walls excepting the power house will be of steel, stone, brick and glass. The plant will have an annual capacity of 300 locomotives.

The Keystone Farm & Machine Co. has begun work on a large addition to its plant at York, Pa.

The Sterling Wrench & Tool Co., Dixon, Ill., is advertising for bids for the building of a plant which is to be completed this winter.

The Scranton Whetstone & Abrasive Wheel Co., with a capital of $50,000, is now building a plant at Scranton, and expects to have it in operation by Nov. 15.

The Hansen Machine Co., Boston, whose plant was recently visited by fire, is rebuilding, and will start up this month.

The Pittsburg and Valley Districts:—

The Wilkes Rolling Mill, Sharon, Pa., which has been idle for some time, resumed operations in full this week.

The Shenango plant of the American Tin Plate Co. was shut down this week with the exception of the cold rolling and tinning departments. The thirty hot mills will probably be idle for the next four weeks. Some necessary repairs are to be made.

The hot mills of the Humbert plant of the American Tin Plate Co., Connellsville, Pa., were shut down this week for an indefinite period. The cold mills and tinning department will continue in operation until the present stock is worked up, when they will also shut down.

The annual meeting of the stockholders of the Westinghouse Air Brake Co., Wilmerding, Pa., will be held on Oct. 6. A proposition to merge the Electro-Magnetic Brake Co. with the air brake company will be voted upon. The magnetic brake company is at present one of the subsidiary companies of the air brake company.

The Page Woven Wire Fence Co., Monessen, Pa., placed another wire mill in operation this week. The rod mill will be placed on double turn within a few days and the weaving department, which has been idle for some time, will be placed in operation this week.

The twelve hot mills of the National plant of the American Tin Plate Co., Monessen, Pa., which have been idle for several weeks, resumed operation on Monday.

The open-hearth plant and rolling mill of the Clairton Steel Co., Clairton, Pa., resumed operations this week after being idle for four weeks. While the steel plant was off, the two furnaces were piling a large amount of iron, and it is probable that the furnaces will be banked for a short time until this stock is disposed of.

General Industrial Notes:—

The American Bridge Co. has decided to abandon the designing and drafting departments of its Eastern division, which have been maintained for several years in connection with the structural steel plant of the Pencoyd Iron Works. This action will be taken with a view to concentration and economy. The majority of the 100 or more draftsmen and engineers will be transferred to the plant at Ambridge, Pa., and to New York.

American brake shoes are to be manufactured in Mexico, it having been arranged that the specialties of the American Brake Shoe & Foundry Co. are to be turned out for the Mexican market at the Monterey Machine Works at Monterey.

The Riverside Foundry & Machine Works, Riverside, Cal., have been sold by the proprietor, H. A. Landwehr, to Theodore D. Hewitt. Landwehr has had 15 years' experience in the foundry business. It is his intention to enlarge the plant.

The Weller Engineering Co.'s plant, Elyria, O., has been purchased by the Elyria Lumber & Coal Co. Under the new management the Weller-Brown friction clutch pulley will be manufactured exclusively.

The Alabama Tube & Iron Co. has been reorganized as the Alabama Tube & Horseshoe Co., has secured a charter under the New Jersey laws, and will resume operation at its tube iron works at Helena, Ala.

Frank Iler, who has been engaged for several years in manufacturing mining machinery on a small scale at Marion, O., will remove his plant to Denver, Colo., where he will establish a company with larger capital and plant.

The Washburn Co., Minneapolis, has acquired the stock, property and business of the Washburn Coupler Co., of that city. The change in ownership does not include any great changes in the management, the Washburn company having been organized to take over the business of the Washburn Coupler Co. in order to extend its operations in regard to car couplers and other lines of railroad supplies.

The Dillon-Griswold Wire Co., Sterling, Ill., is increasing the output of its wire and nail mills, and has contracted for a large quantity of new equipment. A new water turbine will be installed, furnishing 500 additional horsepower.

The building formerly used by the People's Market Co., Erie, Pa., is now in operation as a machine shop. The new concern is a restoration of the old Bay State Iron Works. It practically closed its career as a company in 1899. The building occupied by the company is a two-story brick structure, 110x58 feet, with a boiler house and blacksmith shop addition 20x30 feet.

An officer of the Lackawanna Steel Co. states that the closing of the furnaces at Lebanon, Pa., is the result of the continued piling of pig iron which would have been used at the new Buffalo rail mill had not construction delays occurred there. It is expected that the rail mill will be in operation some time in October, and operations at Lebanon will be resumed in the spring.

The Brown Hoisting Machinery Co., of Cleveland, has nearly finished the construction of a number of hoisting machines to be installed in the harbor of Havana, Cuba. It is said it will revolutionize the handling of cargoes from the large ocean steamers to the docks of Havana harbor. Under the old Spanish regime in Cuba, primitive methods of handling freight were in vogue.

The Crum Lynne Iron & Steel Works, Chester, Pa., resumed operations last week, after being closed for several months. About 100 men are employed at the plant. The plants of the Seaboard Steel Castings Co., the Chester Steel Castings Co., the Tidewater Steel Co., and the American Steel Casting Co. are all running on full time.